

THE COMMERCIAL CAR JOURNAL

Entered as Second-Class Matter at the Post Office at Philadelphia, Pa.

Packard

STABILITY—AN ASSET

Packard trucks are an asset. They are an investment, not a speculation.

Packard truck prices are the fair prices which will insure the quality you want, the service you must have and the stability necessary to protect your investment.

Packard maximum service qualities are your protection against the abnormal repair expense incident to the upkeep of so-called "bargain trucks."

Intrinsic value, unequalled facilities for inspection and service, the permanency of the Packard organization, economy of operation, one fair price to all—these are the reasons why Packard trucks are predominant in 185 separate lines of trade.

Sizes and body types to meet the demands of practically all branches of transportation.

CHASSIS F. O. B. DETROIT

| | | | |
|-------------|--------|-------------|--------|
| 2-Ton . . . | \$2800 | 4-Ton . . . | \$3550 |
| 3-Ton . . . | \$3400 | 5-Ton . . . | \$4150 |
| 6-Ton . . . | \$4300 | | |

Over 3500 Packard trucks are being used by successful concerns and these owners are drawing dividends on the investment. Our ultimate success depends upon what our patrons say of our vehicles.

ASK THE MAN WHO OWNS ONE

WHEN YOU PURCHASE A PACKARD, PACKARD SERVICE IS A PART OF YOUR INVESTMENT, AND YOU KNOW A PERMANENT INSTITUTION STANDS BACK OF IT

PACKARD MOTOR CAR COMPANY, DETROIT

LINCOLN HIGHWAY CONTRIBUTOR

Truck Operations are Constantly Interrupted for Spring Repairs

Operating Sheets Show

Costs for Spring Repairs, which mean
Increased Maintenance

Lost Truck Hours, which mean
Decreased Service

You Bought SERVICE! Do you get Spring Service?
Broken Springs can be eliminated, but only by

THE AMES Equalizing Spring

A leaf spring placed under the clips to take THE RECOIL

It is the RECOIL that BREAKS your springs

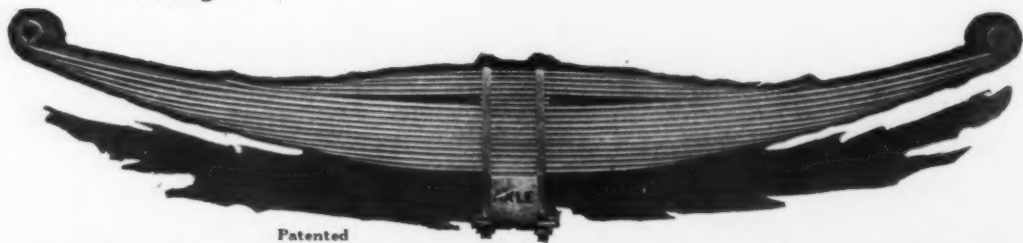
Cushion Recoil with the Ames Spring just as the Truck
Spring cushions compression

Lost time for Spring Repairs is a proper charge against
maintenance

Cut your operating costs

Notice steel spacing plate between two springs

Investigate



Patented

CLARENCE N. PEACOCK & COMPANY

EXCLUSIVE LICENSEES

DEPT. M

1790 Broadway, New York, N. Y.

5986 Center Ave., Pittsburgh, Pa.

When Writing, Please Say—"Saw Your Ad. in the C C J"



THE PUBLISHERS' PERSONAL PAGE



**"He That Blows in the Dust,
Fills His Own Eyes."**

The truth of the above adage has been well exemplified by the actions of some, even of the prominent manufacturers in the automobile business. These few have been blowing so much lately about the action of the banks, the stringency in the money market, and the lack of interest on the part of the purchasing public, and have so filled their own eyes with the dust of apprehension, that they cannot even now see that conditions have changed.

We have pointed out in these columns that difficulties caused by the action of the banks, can be just as quickly removed by a remedial action on their part. **Public Come Back** The public at such times acts very much like a rubber ball, and although suddenly depressed by a financial stringency, or even by talk of hard times, they rebound with surprising elasticity and alacrity after the blow. This is especially true with the purchasing of a necessity, such as the modern commercial car must now be considered.

That the adverse conditions recently experienced by commercial car makers were but temporary, is shown by the sudden revival of buying, particularly in the Middle and Western States. **Renewed Interest** Everywhere renewed interest is shown by those in a position to purchase. Business men who might purchase fleets have merely been marking time, as is always the case when tariff schedules or banking interests are being considered at the Nation's capital.

The trade revival is growing rapidly, and from all sources reports are flowing in of better business, and an increase of sales may be expected in all types of commercial cars. **Trade Revival Growing**



The Autocar

Both Large and Small Business Concerns Profit by Using AUTOCARS

John Wanamaker owns 110 AUTOCARS

Adams Express Company owns 188 AUTOCARS

There must be some good reason why John Wanamaker and Adams Express Company have been purchasing AUTOCARS from time to time since 1909. There must be some good reason why other concerns who purchased an AUTOCAR several years ago are increasing their delivery equipment with AUTOCARS.

That the AUTOCAR principle is correct is verified by more than 1300 prominent concerns of this country representing every line of business, owning from 1 to 188 AUTOCARS each.

At a chassis price of \$1850, the AUTOCAR Delivery Vehicle is the best buy on the market today. Why not investigate AUTOCAR values now, and make your business grow by their use.

The Autocar Company
Ardmore, Pa.

ESTABLISHED 1897

**FOR BUSINESS
EXPANSION**

When Writing, Please Say—"Saw Your Ad. in the C C J"

The Commercial Car Journal

VOLUME VI

PHILADELPHIA, FEBRUARY 15, 1914

NUMBER 6

TRUCK STANDARDS IN CARD FORM

Sets of cards showing the various commercial vehicle standards recommended in 1912 by the National Association of Automobile Manufacturers, are being mailed to all manufacturers of commercial vehicles by the National Automobile Chamber of Commerce, Incorporated, successor to the National Association of Automobile Manufacturers and the Automobile Board of Trade.

There are seven cards in the set, all of uniform size, 8 x 10 in., printed on one side only and scored in the middle so that they can be filed flat in an ordinary letter file or folded once and put in an 8 x 5-in. card index file. Each card refers to a single subject, so that the series can be separated and the cards distributed among the various departments in the factory to which they relate. The subjects are as follows:

Standard Warranty, Standard Speed Rating, Standard Body Weight Allowance, Overload Allowance Resolution, Standard Caution Plate, Standard Frame Widths and Lengths and Standard Demonstration Charges.

The Warranty is a new form approved December 3, 1913, and supersedes the motor truck warranty recommended by the N. A. A. M. in 1912. It is a combination of this with the standard passenger car warranty adopted in 1910, and covers both commercial and passenger vehicles.

The tables of speeds, body weights, frame dimensions, and demonstration charges are accompanied by charts of curves corresponding with the figures. The caution plate against overloading and overspeeding and the new lithographed standard warranty are illustrated by half-tone engravings. Prices at which the plates and warranties can be obtained are given.

To encourage the prompt and general adoption of these standards for the best interests of the whole industry, the National Automobile Chamber of Commerce is sending sets of the cards to all companies whose names appear on its list of active manufacturers of commercial vehicles. Upon receipt of request, it will be glad to mail copies to any makers who fail to receive them, and to organizers of new companies who expect to come into the field with new products. Requests should be addressed to Secretary Commercial Vehicle Committee, National Automobile Chamber of Commerce, 7 East 42d Street, New York City.

PALMER-MOORE COMPANY APPOINTS EXPORT MANAGER AND RE- ELECTS OFFICERS

The Palmer-Moore Company, of Syracuse, has just completed arrangements with H. D. Van Brunt, of New York, to handle the entire foreign business of the company with the exception of Canada. Mr. Van Brunt has just returned from Australia, and is specializing on the export trade of American pleasure cars and trucks, and will shortly have fifteen men traveling in foreign countries. Mr. Van Brunt stated that business conditions were particularly good throughout the seven states of Australia.

Table of Contents

| | PAGE |
|---|------|
| Adams Trucks | 68 |
| Advertiser's Index | 131 |
| Buyers' Reference Review | 16a |
| CCJ Gallery of Sales Managers | 16 |
| Conventions of Interest to the Trade | 11 |
| Crown Worm-Drive Trucks | 66 |
| Design and Construction | 53 |
| Editorials | 9 |
| From Across the Water | 49 |
| In the World of the Electric | 57 |
| Information Bureau and Correspondence | 7 |
| New Commercial Cars | 64d |
| News of the Dealers and Garages | 12 |
| Pull-More Front-Drive Truck | 72 |
| Sternberg Two and a Half Ton Worm-Drive Truck | 65 |
| Storage Batteries | 59 |
| Truck Accessories and Appliances | 62 |
| Vim Light Delivery Car—\$635 | 64d |

At the annual meeting of the company, held in Syracuse, January 13th, the following directors were re-elected: T. C. Meachem, T. W. Meachem, J. F. S. Meachem, C. L. Palmer, A. N. Palmer, Edward Moore and R. R. Scott. The following officers were re-elected: T. C. Meachem, president; T. W. Meachem, vice-president, and C. L. Palmer, secretary and treasurer.

NEW HAVEN DEALERS' AUTOMOBILE WEEK

The automobile dealers of New Haven, Conn., have adopted a plan of publicity in connection with their business. They have set apart the last week in March as "Automobile Week" and have engaged a press agent. Each dealer has made a generous contribution for advertising and publicity work, and each participant in the automobile week movement will decorate tastefully his place of business, and will arrange to entertain visitors in the same manner that would be done at a regular automobile show. On Wednesday of the week in question a very interesting parade will go over the principal streets of the city. In the parade will be exhibited the latest designs, and some systems of prizes will be adopted to encourage the decorating of cars and motor trucks for the parade. The entire week is to end up with a banquet at the Hotel Taft in which prominent manufacturers will be invited and asked to talk on topics for the good of the industry. This is the first attempt of a dealers' organization to do anything of this kind.

AUTOMOBILE NOT SO DANGEROUS AS SUPPOSED



STATISTICS recently compiled by the National Automobile Chamber of Commerce, Inc., on street and highway accidents and fatalities, show that the publication of such figures by the daily papers is misleading. These usually indicate that the increase in accidents is due almost entirely to motor vehicles.

A simple analysis shows that the ratio of fatal accidents to the number of vehicles in use is practically the same now as it was in 1911. Of course as there are many more vehicles in use, there are more accidents, but the ratio is not increasing appreciably.

It must also be pointed out that the number of horse-drawn vehicles in the large centers has actually decreased. The figures from Chicago show a decrease of 4000 in the last three years, or from 58,114 in May, 1910, to 50,037 in May, 1913. There should be therefore, an actual decrease in the number of accidents caused by horse vehicles in Chicago, but this is not the case.

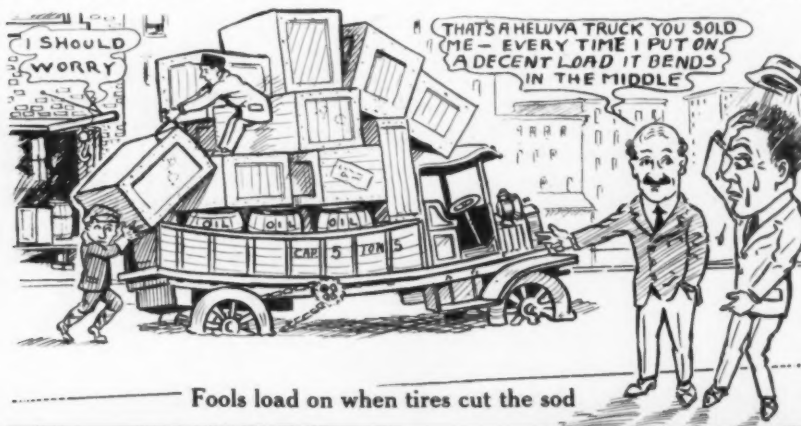
It is estimated that there are in the neighborhood of 6000 less horse vehicles in New York at the present time as compared with three years ago, therefore accidents due to this class of traffic should be 8 per cent. less than in 1911, but the accident figures show that there were 170 fatalities in 1913, 172 in 1911, and 177 in 1912. Instead of a decrease there is an actual increase in the number of fatalities due to horse-drawn vehicles, in spite of the decrease in the number of such vehicles.

It was found that in 1911 there were 3.35 deaths for every 1000 motor vehicles registered in New York City, and this does not take into consideration the fact that many thousand non-resident cars are driven into the city and may have caused some of these accidents. In 1912 the ratio was 3 per 1000, and in 1913 3.4, or practically the same as in 1911.

This proves positively that the ratio of deaths to the number of vehicles in use is not increasing. This analysis also shows that there is no greater carelessness in driving than there has ever been.

One is led to think of what the increase in accidents would have been as shown by the death rate due to horses being as great as ever although less are used, if all of these motor-driven vehicles were not in use, and three or four times this number of horse-drawn vehicles were in use to take their places.

L. A. AUSTIN has severed his connection with the motor truck department of the O. Arnleider Company, Cincinnati, Ohio, and will go into the advertising business at 3119 Woodburn Avenue, Cincinnati, Ohio.



Fools load on when tires cut the sod

MOVING PICTURES AID THE TRUCK SALESMEN

In the motor truck field an innovation has been established by the Pierce-Arrow Company and its agents through the use of the moving pictures as a means of demonstrating the work done by its trucks. Moving pictures have been taken of various operations covering the work done by Pierce-Arrow trucks in brick yards, railway yards, and in sand, brick, gravel and building material industries. Instead of asking the prospective purchaser to view the actual demonstrations, he is requested to call at the agency where the films are run off while the salesman can explain the operations of the truck at the same time. This method saves the time of the business man and convinces many who under ordinary circumstances would not spare the time to view the actual demonstration.

COMMERCIAL CAR TIRE GUARANTEES REDUCED

The Goodyear Tire & Rubber Company, The B. F. Goodrich Company, The United States Tire Company and The Kelly-Springfield Tire Company have reduced the mileage guarantee on commercial car tires sold after January 1, 1914. The mileage guarantee is now 7000 miles per year for all these makes of tires for gasoline cars. Formerly Goodyear and United States tires were guaranteed for 10,000 miles and Goodrich for 8000 miles. Electric vehicle tires are now guaranteed for 7000 miles in eighteen months.

CROCE ELECTS NEW OFFICERS

The Croce Automobile Company, Asbury Park, N. J., manufacturers of the Croce Commercial Cars, have elected a new set of officers: President, Samuel A. Reeves; Vice-president, Albert Robbins; Secretary-treasurer, Harry A. Watson.

THE LINCOLN MOTOR TRUCK COMPANY, San Francisco, Cal., has purchased the building occupied by the Globe Iron Works, Sacramento, Cal., and will produce 1000-lb. and 1500-lb. delivery wagons. This company has been incorporated with a capital of \$200,000.

DE WITT PAGE, who has been secretary, sales manager and advertising manager of the New Departure Manufacturing Company, Bristol, Conn., has been promoted to the position of general manager of the Company.

THE STANLEY MOTOR CARRIAGE COMPANY, Newton, Mass., is said to be bringing out a 1½-ton Steam Commercial Car.

C. Robert Hoyne is again associated with the Autocar Company, Ardmore, Pa., and is acting in the capacity of traveling representative.

South Bend Motor Works have moved into large plant on east side of South Bend, Ind. This company now occupies the plant formerly used by the Singer Manufacturing Company.

Adams Bros. Company, Findlay, Ohio, at its recent annual meeting of stockholders elected the following officers: Joseph J. Kwis, president; C. H. Bigelow, vice-president; L. J. Adams, secretary; B. B. Bigelow, treasurer; D. B. Adams, purchasing agent; J. T. Adams, sales manager; W. D. McCaughey, general manager.

New Incorporations and Capital Increases

Hydraulic Truck Company is establishing factory at Anaheim, Cal., for manufacturing trucks.

Lincoln Motor Truck Company, San Francisco, Cal., has been incorporated with capital of \$200,000.

Midwest Motor Truck Manufacturing Company, Easton, Pa., has been incorporated with capital stock of \$500,000.

Morton Truck & Tractor Company, Harrisburg, Pa., has increased its capital stock from \$250,000 to \$300,000.

Wilcox, H. E. Motor Company, Minneapolis, Minn., has decided to enlarge its output, and is offering, subject to prior sale, \$500,000 of its 7 per cent. cumulative preferred stock in \$100 shares.

L. & G. Chain Company has been formed by Harold A. Leavitt and M. C. Goodman, for the manufacture of traction chains for automobile trucks. A factory is to be erected at Detroit, where the headquarters are also to be established.

Dayton Auto Truck Company has been succeeded by the Durable Dayton Truck Company, organized under Ohio laws with a capitalization of \$25,000. The corporators are: B. A. Troxel, J. B. Ford and C. B. Foley.

Jeffery, Thos. B., Company, announces the appointment of C. P. Rockwell, Inc., as representative for the new Jeffery cars in New England, and of the Jeffery Sales Company as representative in Philadelphia. Mr. Rockwell has formed a new company which will occupy the Jeffery building at 640 Commonwealth Avenue, Boston. The Jeffery Sales Company, of Philadelphia, is located at Broad and Race Streets.

V-Ray Company, Marshalltown, Ia., at its recent annual meeting, trebled its capital stock. Mr. Dwight H. Denmead acquired one-third interest in the company. Mr. Sinclair and Mr. Hansen owning a third interest, respectively. The following officers were elected: V. N. Hansen, president; B. W. Sinclair, vice-president; Dwight H. Denmead, secretary-treasurer. Messrs. Hansen and Denmead have headquarters at the factory offices at Marshalltown, and Mr. Sinclair manages the coast branch of the company at San Diego, Cal.

Wasatch Motor Manufacturing Company has been organized in Salt Lake City, Utah, with a capital of \$100,000 for the purpose of building both pleasure cars and trucks. The company expects to build a four-acre plant on a ten-acre plot. During the first year only trucks will be produced. The officers of the new company are: A. E. Young, president; John A. Maxwell, vice-president; C. M. Fallas, vice-president; J. B. Hamby, secretary; R. E. Montrose, treasurer. Geo. T. Smith, formerly in charge of the motor truck mail delivery in New York City, and later with the Ewing American Motor Car Company, is chief engineer and superintendent.

Kelly Motor Truck Company, Springfield, Ohio, has reduced its capital stock from \$500,000 to \$5000.

Personal Items

C. L. Williams has become salesman for the Van Winkle Motor trucks in Atlanta, Ga.

F. J. Alvin has been appointed general sales manager of the Sears-Cross Company, with headquarters at 650 Woodward Avenue, Detroit.

J. J. Martin has been appointed district manager for the Middle Western States by the Stewart Motor Corporation, with headquarters in Chicago. For the past year and a half Mr. Martin has been connected with the Commerce Motor Car Company of Detroit.

Chas. E. Wade, of the Chas. E. Wade Sales Company, Detroit, has become sole selling agent in the Middle West for Barthel & Daly, importers of Schafer ball bearings, New York City. Mr. Wade was formerly selling agent for the Rhineland Machine Works Company.

Leighton Dunning, formerly connected with the Engineering Department of the General Electric Company, Schenectady, N. Y., is now in charge of the laboratory and testing plant of the American Bronze Company, manufacturers of the famous non-gran fibrous bearing bronze, whose plant is located at Berwyn, Pa.

Edward McK. Hunt has been appointed district sales manager by the Stewart Motor Corporation for Connecticut, New York City, New Jersey, Eastern Pennsylvania and Virginia. During the past year Mr. Hunt has been one of the moving spirits in the Ingle-Hunt Motors Company at Newark, N. J., distributors in northern New Jersey for Stewart delivery trucks.

H. R. Fletcher has been appointed district sales manager by the Stewart Motor Corporation and will look after the interests of the Stewart in northern and western Pennsylvania, New York State, and Quebec and Ontario Provinces in Canada. During the past year Mr. Fletcher has been connected with the E. V. Stratton Company, Albany, N. Y., in charge of the Stewart division.

Citizens Street Traffic Committee of Greater New York has been organized for the purpose of assisting the municipal government in bettering traffic conditions. A deputy commissioner will be appointed to supervise traffic matters, and will be supported by five experts on traffic matters. Robert Grier Cooke, president of the Fifth Avenue Association, is chairman, and Elmer Thomson, secretary of the Automobile Club of America, is secretary.

AUCTION

52 HORSES—15 WAGONS



SATURDAY, JAN. 31, at 10 a. m.

In Our Stable Yard 1920 North Main Street, We Will Sell All Our Horse Equipment, Consisting of the Following:

- 10 Head of Heavy Draft Horses
- 1 Light Gray Horse
- 1 Dark Horse, Flanders Type with Dishes
- 1 Dark Horse
- 1 Gray Horse
- 1 Gray Horse, English Saddle
- 1 Heavy Team Harness
- 1 Heavy Harness
- 1 Light Harness

The above will positively be sold to the highest bidder, as we have purchased a complete stock of White Gasoline Trucks from the Pioneer Commercial Auto Company, Alhambra, at \$1000 each.

TERMS: 2 per cent. Cash—Balance Paid by Note at 7 per cent.

Los Angeles Brewing Company
1920 North Main Street, Los Angeles

Striking Evidence of the Wholesale Manner in Which Motor Trucks Are Replacing Horses

Three years ago the Pioneer Commercial Auto Company, of Los Angeles, sold the Los Angeles Brewing Company its first motor truck. So efficient did this truck prove that the company gradually increased its motor equipment and dispensed with horses. Nine White trucks which were recently delivered, displaced the last lot of fifty two horses, and placed the company's delivery department on an all-motor basis.



Adams Hauling Nitro-Glycerine

This one and a half ton machine is used by the American Glycerine Company, Bartlesville, Okla. It has a capacity of 720 qts., and is fitted with special 42 in. wheel, and enclosed chains, for negotiating Oklahoma roads.



A Contrast

Four and even six horses were found inadequate for hauling the five-ton load delivered by the Pierce-Arrow shown above. The White truck worked continuously, hauling milk from snow-bound trains, during the recent Cleveland blizzard, and the C. T. electric did valuable service after horses had entirely disappeared from the streets.

"Horse Down!"

This is the cry of the poor horse user whenever the streets are in the condition shown above. "Horse" spells inefficiency. Winter weather simply makes this lack of efficiency visible that "he who runs may read." Not only from a humanitarian standpoint, but from a standpoint of dollars and cents, the horse must be replaced by motor-driven vehicles.



INFORMATION BUREAU AND CORRESPONDENCE



STARTING A COLD MOTOR

I have great trouble in the winter months in starting the air-cooled motor in my truck. What can I do to make this easier.

ALBANY.

CATERER.

An air-cooled motor is sometimes a little more difficult to start than a water-cooled one owing to less compression due to a looser piston fit. It might be well for you to get an oil can and have a screw cap fitted to the nozzle. Fill this with one part ether to two parts gasoline and use as a priming mixture.

Do not attempt to use too great a proportion of ether, as it has great explosive power. If your motor has been standing a long time you might place cloths which have been soaked in hot water on the intake manifold and carburetor. Should there be a very decided lack of compression when starting, you may overcome this to some extent by squirting a small amount of oil in each cylinder and then turn the motor over a few times. This will serve to fill the space between the cylinder wall and piston till the latter have a chance to expand through heat.

KEROSENE AS A FUEL

Does the lack of even one truck maker designing his motor to use kerosene indicate that this fuel or rather carburetors to use it are not practical at this time.

CLEVELAND, OHIO.

A TRUCKMAN.

Kerosene can be and is used on many trucks and in Southern California "distillate" is a common fuel for motor trucks. For some reason not yet satisfactorily explained truck manufacturers seem backward about breaking away from gasoline.

Many will not consider conducting experiments along this line. In our reading pages you will find private owners mentioned who are securing excellent results with kerosene burning trucks, and in our advertising columns are listed carburetors and vaporizers which are well worth your consideration and can be readily attached to any make of machine.

REDUCING DRIVING-WHEEL SLIP- PAGE ON WET OR SNOW- COVERED INCLINES

I often notice that the driving wheels of my truck seem to slip a great deal more while climbing wet, snow or ice covered hills than other vehicles on the same grades. I mean when not using any anti-skids. Will you kindly tell me the reason for this?

NEW YORK.

TRUCK DRIVER.

Your trouble is probably due to the manner of your driving and is one common with others. Because of the slippery condition of the pavement, you probably shift

to the lowest gear with the idea of securing better traction; therein lies your mistake. Under these conditions you should make use of the highest gear possible without causing the engine to knock.

SAND BOXES

Would not the attachment of a sand box so as to allow the sand to drop in front of one of the driving wheels prevent skidding on slippery pavements and hills.

NEW YORK.

B. R. PHILLIPS.

This is not a new idea in truck construction, though rarely used. There are two very important items which must be considered in the connection of sand boxes or they may be of no value. First, the box must have a cover which renders the interior absolutely water-tight,—the night washer with his hose or a heavy rainstorm will otherwise cause failure in the operation of the box. Second, the pipe through which the sand flows should be of ample size to prevent clogging and the opening at the end should be without taper and cut with an angle sloping upward toward the front of the truck.

The discharge opening should be about 10 in. above the ground in front of the wheel. One of the best devices of this nature allowed the exhaust gases to pass through the sand and thereby overcome the tendency of the sand to pack and not run out when required.

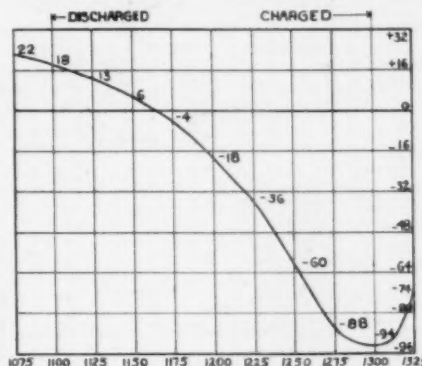
FREEZING OF ELECTROLYTE IN STORAGE BATTERIES

Many users of storage batteries, both ignition and vehicle, are under the impression that the electrolyte cannot freeze in winter. This belief is an error. However, it is true that when the battery is more than half charged, the solution will not freeze, but when nearly discharged, there are many winter days when it would freeze.

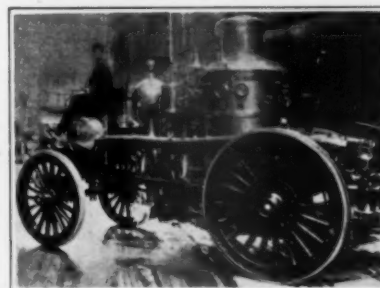
In order to understand this matter clearly, it is necessary to understand the chemical "workings" of the storage battery. When the battery is in a fully charged condition, the specific gravity of the electrolyte should be 1300 deg. Baume. The positive plate is filled with active material consisting of peroxide of lead. The material on the negative plate is porous lead sponge, free from oxygen.

When the battery discharges, or does work, some of the sulphuric acid combines with the lead sponge of the plates and water is formed as a by-product and enters the solution. It can be seen therefore, that up to the time the battery is completely discharged, the solution gradually becomes weaker, or the proportion of acid to water less.

As the weaker solution freezes at a higher temperature than the stronger, it can be easily seen that the discharged battery is liable to freeze and care should be taken of a battery in this condition.



The accompanying table shows the freezing points of the solution at its different strengths or specific gravities. This table of freezing points applies only when the battery is not being charged or discharged. If being charged or discharged, enough internal heat is generated to prevent it from freezing, no matter what its condition.



Steamer on Firestones

This old self-propelled steamer, of Boston, was unreliable in answering alarms, but could throw water with the best of them. She would not answer her helm, and was losing favor. Firestone solid rubber tires were fitted, and solved the difficulty.

Goodrich, B. F., Company has issued Volume II of "Motor Trucks of America," which is an excellent piece of work, and is increased from 68 pages last year to 112 for the 1914 issue. It contains illustrations and specifications of over ninety trucks built in the United States, and the information is full and accurate, covering every detail of interest in the make-up of the truck.

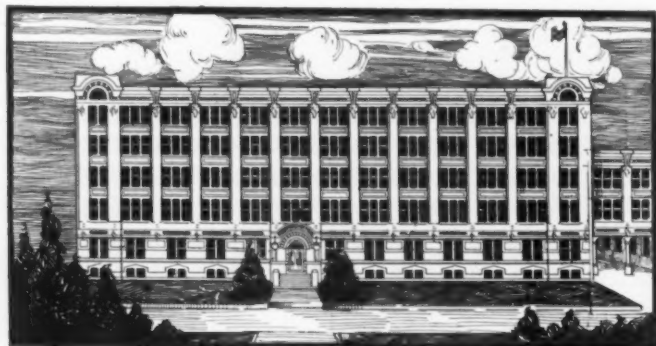
NEW DEPARTURE MANUFACTURING COMPANY NOW OCCUPIES NEW ADMINISTRATION BUILDING

The New Departure Manufacturing Company, of Bristol, Connecticut, has just moved into its large and handsome Administration Building, which has been in the course of erection for the past twelve months.

The phenomenal growth of this company in the past few years has made it necessary to frequently provide large additions to its manufacturing facilities. The demand for New Departure Ball Bearings has increased so rapidly that the company could not wait to build necessary additions

are mahogany, and the workers in each department are immediately opposite the private office of the head of that department. The remainder of the building will be occupied principally in the inspecting and assembling of the company's product. The first floor will be given over entirely to shipping and receiving.

The company this year enters upon the first days of the second quarto-centenary of its existence. Something like twenty-five years ago, the New Departure Manufacturing Company started business in a small room containing less than sixty sq. ft. and to-day it is occupying nearly that many square acres, with several millions of dollars invested in machinery, operated by two thousand skilled mechanics, and



New Administration Building of the New Departure Manufacturing Company

and bought out the extensive plant of the Whitlock Coil Pipe Company, at Hartford, comprising 145,000 square feet of floor space. It was not long before still further additions became imperative. Office quarters were also insufficient, and it was decided to provide adequate facilities by the erection of this building, which is 62 ft. wide, 220 ft. long, and six stories high, including the basement.

The building is modern in every detail of construction and absolutely fireproof. The office is located on the fifth floor. An electric elevator, of the latest type, runs from the lobby of the building to the lobby of the office. At the front and south side are located the private offices of the officials and heads of departments. These are finished with panels of mahogany carried up to the height of the window sills. The partitions between the general office are of plate glass above the wainscot. At the west side is a double fire and burglar-proof vault of two stories. All equipment in this vault is steel and absolutely fireproof. A feature of the main office is the large leaded glass dome ceiling light, running 112 ft. long and 16 ft. wide. This is supported on pilaster columns of the Doric order. The colors in the dome are opalescent greens and ambers, which catch and diffuse the sun's rays without causing shadows.

On this floor, in addition to the general office, is a large foremen's conference room, with a small kitchen attached, equipped for serving luncheons. All office furnishings

busy day and night the greater part of the time. It is one of the most thoroughly equipped manufacturing plants in America. One entire building is devoted exclusively to the scientific study and analysis of steel and manufacturing processes. This building is equipped with chemical, metallurgical, and physical testing laboratories, outfitted with the most modern apparatus.

Beginning January 1st, changes were effected in the organization, which will still further develop the plant to its many possibilities. Mr. Albert F. Rockwell, who was one of the founders of the company, and whose genius has developed the patents covering the company's product, has been relieved of certain managerial details, but continues his duties as President.

Mr. DeWitt Page, who has also been identified with the company almost from its inception and in later years as Secretary, Sales Manager, Purchasing Agent and Advertising Manager, has been appointed General Manager. Mr. Page is well known to the trade and brings to his position unusual abilities, and a knowledge of the company's affairs in production and promotion that specially qualifies him for his position.

Mr. Charles T. Treadway, who for some years past has been Treasurer of the company, continues in that capacity but also becomes Chairman of the Board of Directors, and in that capacity becomes an important factor in the future development of this most successful New England manufacturing enterprise.

C. Y. KNIGHT ADDRESSES UNITED MOTOR LICENSEES

At the Auditorium Hotel, Chicago, on January 29th, Mr. C. Y. Knight gave a talk to representatives of the following firms, who are licensed under the Knight patents.

F. B. Stearns Company, Cleveland; Mr. F. B. Stearns, Guy Vaughan, and F. B. Sterling being present. The Moline Automobile Company, of East Moline, Ill., represented by W. H. Vandevort, C. H. Vandevort, A. P. Brush, Eugene Grunewald, and M. L. Bradley. The Willys Overland Company, of Toledo, Ohio, John N. Willys and H. J. Edwards being present. The Lyons-Atlas Company, of Indianapolis, Ind., being represented by J. W. Lyons, H. A. Knox, C. E. Sargent, F. E. Robinson, John Holtenbeyer, and Rodger B. McMullin, Chicago, represented by George Brainard.

He called attention to the advances made in public favor during the past year by the Knight sleeve valve motor, and pointed out the adoption of this type of engine by the motor bus line of London. Four hundred and fifty buses with this type of engine were taken over by the London General Omnibus Company, with the Metropolitan Electric Traction Company's vehicles, and four hundred motors were also purchased from the Daimler Company, making a total of eight hundred and fifty sleeve valve motors in the London bus service alone.

ORDER FOR HANDSOME PALMER-MOORE

The Palmer-Moore Company, Syracuse, N. Y., has just received an order for a particularly handsome truck through its Minneapolis dealers. This truck is going to the well known "White Store," a leading meat market of Minneapolis. The order calls for a water-cooled model with a full panel top. The body is to be painted a dark maroon with gold lettering and striping, and the running gear is to be white enamel with gold striping. In fact the decorations of the truck are to correspond with the decorations of the meat market, which are in white and gold. The truck is to be used for the down town trade exclusively, for the delivering of meat to the high-class restaurants and hotels. It is to be run night and day with two shifts of drivers, who will wear maroon and gold livery.

ELECTRIC VEHICLE BUREAU

An electric vehicle bureau has been established by the United Electric Light & Power Company, of New York City, for the purpose of furthering the sale and use of electric vehicles in that city, and co-operating with companies distributing vehicles and their accessories, as well as with the garages and owners of vehicles. The bureau will collect transportation and operating data and make it a point to interest the operators of horse-drawn vehicles in "doing it electrically." David E. Tobias is the manager.

Firestone Tire & Rubber Company has opened a branch at 65-69 West Park, North, Portland, Ore.

THE COMMERCIAL CAR JOURNAL

Vol. VI. PHILADELPHIA, FEBRUARY 15, 1914 No. 6

Published the 15th of each month by the

CHILTON COMPANY

Market and 49th Streets

Philadelphia, U. S. A.

JAMES ARTMAN President
GEO. H. BUZBY Vice President
C. A. MUSSELMAN Treas. and Gen'l Manager
A. H. VAUX Secretary

ADVERTISING DEPARTMENT

Western Manager.....C. C. McKINNEY, Chicago
Eastern Manager.....C. MONROE SMITH, New York

EDITORIAL DEPARTMENT

JAMES ARTMAN.....Editor-in-Chief
E. S. FOLJAMBE.....Managing Editor

ASSOCIATE EDITORS

ALBERT G. METZ J. HOWARD PILE

SUBSCRIPTION RATES

United States and Mexico.....One Year, \$1.00
Other Countries in Postal Union, Including Canada.....One Year, \$2.00

Make checks, money orders, etc., payable to Chilton Company.

Change of Address—Subscribers desiring their address changed, should give the old as well as the new

Entered as second-class matter at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.

1914 OPENING WITH VIGOR

Housecleaning Period Past and Early Buying Begins



THE National Shows demonstrate that the interest of the buying public in the automobile is even greater than ever before. This of course refers to the pleasure car, as there were no national commercial car exhibits this year. However, the agents and the manufacturers of motor-driven trucks were there, and talks with them showed conclusively that there has been an entire change of feeling for the better in the trade during the past two months.

For some time makers have been curtailing their output, placing somewhat smaller orders for parts and accessories, with the belief that there might be less buying than had been anticipated. The temporary lull through which the truck industry has been passing was largely due to the political situation, shifting of the tariff, and adjusting of the banking laws. The withdrawal of credit by some of the banks, of necessity caused embarrassment to many commercial car makers, to some even of those who have been doing business

as conservatively as other lines are conducted. There were, however, altogether too many makers conducting their business on anything but a conservative basis and, some of these have within the last few months been dropped out of the running.

All of this has been a benefit to the commercial car industry. To say that a period of depression or of slow sales has been a benefit, sounds like an anomaly, but nevertheless such is the case. This period has brought manufacturers face to face with present conditions, and caused them to look carefully into the future. In numerous instances past business extravagances have been eradicated, lax business methods have been corrected, and all future plans are now based on more sound and business-like principles.

This was a lesson needed by the business wagon end of the automobile industry. The haphazard, go-as-you-please methods so long employed by too many makers will never again be permitted. Ways and means of conducting the financial end of the industry so that the numerous and formerly unthought of leaks, have been cut off, are now the order of the day, and the business of manufacturing commercial cars is thereby benefitted. This effect has been not only sufficient to tide some of the shaky ones over the past period of temporary difficulty, but has brought about lasting benefits which will be felt by these companies in their future business, all of which proves the saying, "it is an ill wind," etc.

Now on every side there is proof that this period of depression has passed, and that from the purchaser of the individual car up to the buyer of fleets, there is a tendency to place orders. Naturally this might be expected at this time of the year, but talks with manufacturers show, that this buying has begun fully a month in advance of the usual time, and with considerable vigor. This indicates that it cannot be accounted for by the time of year alone, but is a reaction due to the past period of depression. In all sections, especially throughout the Middle Western states, truck makers are now very busy, and orders are pouring in at a rate which promises an unprecedented year for 1914.

With the competition of the weaker and less reliable companies eliminated, there is even a greater opportunity for the conservative and substantial makers to do business. Taking everything into consideration, it may be said that the housecleaning period is practically over, and that the industry properly swept and freshly garnished, should make a better showing than in any previous year. The outlook for big business for 1914 is certainly very promising.

MILWAUKEE FENDER ORDINANCE KILLED

The Stegeman Motor Car Company, of Milwaukee, Wis., after unselfishly devoting considerable time and labor opposing a proposed city ordinance requiring fenders on trucks, prevented its passage, and the resolution was killed while yet in the committee.

As the truck fender ordinance seems to be a hobby with city councils at the present time, and other cities may have the same problem confronting them, we publish herewith a copy of a circular letter which the Stegeman Company sent out. The answers to this letter were invariably against the truck fenders.

In the January issue of this publication, page 15, we published an article by John Younger, which was read before the

Mid-Winter Meeting of the S. A. E., which throws much light on this subject, and shows that truck fenders do not in reality accomplish the purpose for which they are intended, and merely cause a hardship on the truck user.

DEAR SIR:

SUBJECT: *Opposition to Truck Fender Ordinance.*

An ordinance has been introduced into our Common Council, which, if passed, will compel all owners of motor trucks in Milwaukee to equip their machines with a "safety fender, similar in design and operation to that carried on electric street cars." These fenders will cost between \$75 and \$100 per truck and be a source of continuous annoyance and repair expense to owners.

Due to our prominent position in the local motor truck field, we have been asked, in the interest of all owners, to aid in a united and rigid protest and fight the passage of this ordinance.

Your immediate co-operation is necessary, as similar ordinances have recently been passed in Detroit and Chicago and will be passed here unless strong pressure and proof of its absurdity is brought to bear.

Will you kindly write us stating your opinion; 1, whether you favor or oppose such ordinance and why; 2, whether in the light of the slow speed of motor trucks, you deem same necessary to "safe-guard life"; 3, how many trucks you operate, how long you have operated them, and whether your machines at any time have caused any "fatality," which a front guard or fender, as proposed, would have avoided.

Further these fenders when lowered will be within 6 in. of the ground, and when raised, no higher than 10 in., and to be operated from the driver's seat. What effect do you believe they will have in negotiating bad roads, and will they impede the service of your machine in deep snow?

We trust you will give this your immediate attention, and with the united co-operation of all prominent truck owners, we hope to defeat what we believe an imposition on Milwaukee business men.

Awaiting your reply by return mail, we remain,

Yours very truly,

STEGEMAN MOTOR CAR COMPANY.

MARTIN CLAIMS TO HOLD BASIC PATENTS ON TRACTORS

The Martin Tractor Company, Springfield, Mass., have issued a circular of warning to the trade in which they say:

"No one can combine any automobile with a wagon in such a way that the wagon is supported on wheels at the rear and supported in front on the back of the automobile by any rocking connection whatever without infringing basic patents owned by C. H. Martin.

"The Martin Tractor Company, of Springfield, Mass., and the Knox Automobile Company, of Springfield, are the only licensees under these patents. Both the owner of the patents and the licensees will avail themselves of every protection afforded by law to prevent invasion of their rights."

MACCAR TRUCK COMPANY, Scranton, Pa., has been organized and has taken over the Maccar Company, formerly located in Allentown.

Steel and Rubber Markets

Steel Active and Strong

The steel market showed great improvement during the month of January. The U. S. Steel Corporation reported orders booked for 331,572 tons more during the month of January than was produced, and as other mills are having a similar experience, a general advance in prices has resulted. Quotations as of February 10th, were:

STEEL PRODUCTS PRICES

| | | | |
|--|-------|---|-------|
| Bessemer steel, per ton, mill | 21 00 | a | ..... |
| Open hearth, per ton, mill | 21 00 | a | ..... |
| Steel bars, per ton | 22 00 | a | ..... |
| Steel bars, soft base, half ex tidewater | 1 36 | a | 1 41 |

The above prices are at tidewater in carloads and larger lots. For quantities less than 2000 lbs., but not under 1000 lbs., \$2 per ton additional is charged, and less than 1000 lbs., \$8 per ton additional.

SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots \$2 per ton higher.

| Gauge— | Black, | Galvan- | Gauge— | Black, | Galvan- |
|--------------|--------|---------|--------|--------|---------|
| | ized. | ized. | | ized. | ized. |
| Nos. 22 & 24 | 1 80 | 2 10 | No. 28 | 2 00 | 3 00 |
| Nos. 25 & 26 | 1 85 | 2 80 | No. 29 | 2 05 | 3 05 |
| No. 27 | 1 90 | 2 90 | No. 30 | 2 10 | 3 25 |

IRON AND STEEL AT PITTSBURGH

| | | | |
|--|-------|---|-------|
| Bessemer iron | 14 90 | a | ..... |
| Bessemer steel, f. o. b. Pittsburgh | 21 00 | a | ..... |
| Muck bars | 28 00 | a | 29 00 |
| Skelp, grooved steel | 1 20 | a | 1 25 |
| Skelp, grooved iron | 1 55 | a | 1 60 |
| Ferro-manganese (80 per cent.), seaboard | 11 00 | a | 11 50 |
| Steel bars | 1 15 | a | 1 25 |
| Black sheets, 28-gauge | 1 95 | a | 2 00 |
| Galvanized sheets, 28-gauge | 2 95 | a | 3 00 |
| Blue annealed, 10-gauge | 1 40 | a | 1 45 |
| Tank plates, 3/4-inch and heavier | 1 20 | a | 1 25 |

Rubber Advances to Seventy-seven Cents

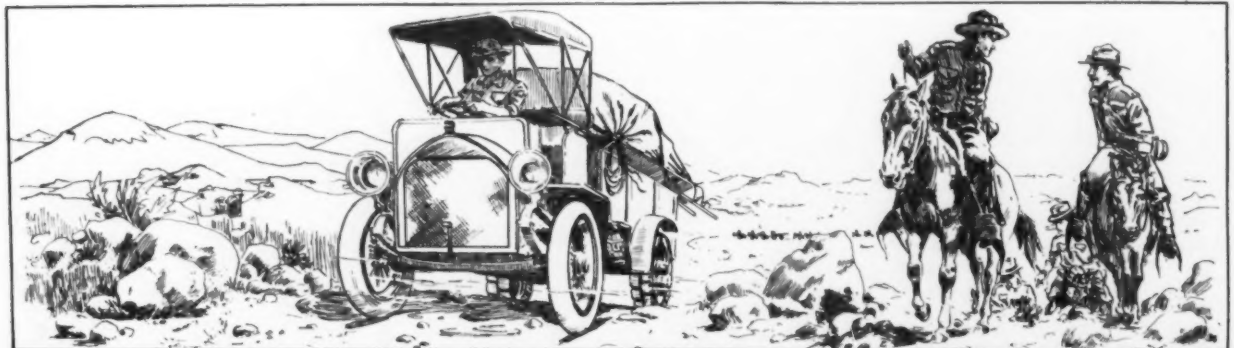
At the fortnightly sale held in London, February 10th, crude rubber advanced from 3 to 4 cents a pound, this is the most pronounced advance for several months and indicates a renewed demand. The New York quotations as of February 10th were:

| | | | | | | | |
|------------------|---------|---|----|----------------------|---------|---|----|
| Up-River— | | | | Balata, sh't | 45 | a | .. |
| Fine | 77 | a | .. | Ciudad, b'k | 48 | a | .. |
| Coarse | 48 | a | .. | Trinidad, b'k | Nominal | | |
| Island— | | | | Africans— | | | |
| Island, fine | 70 | a | .. | Massal, red | 47 | a | .. |
| Coarse | 51 | a | 32 | Red C'go | Nominal | | |
| Cameta | 35 | a | 36 | B'k C'go | 47 | a | .. |
| Caucho— | | | | Soudan— | | | |
| Balls | 48 | a | 49 | Niggers | Nominal | | |
| Centrals— | | | | Gambia, prime | 44 | a | .. |
| Corinto | 45 | a | .. | East India— | | | |
| Esmeralda | 39 | a | .. | Smk, sh'ts | 66 | a | 67 |
| Guatemala, slab | 41 | a | .. | Ceylon, bis and shes | 64 | a | 65 |
| Mexican— | | | | Pale crepe | 65 | a | 66 |
| Scrap | 42 | a | 41 | Pontianac— | | | |
| Strips and scrap | 45 | a | 46 | Prime plantation | 6 | a | .. |
| Guayule | Nominal | | | Palembang | 6 | a | 7 |

Tires—

| | | | |
|---------------------------|-------|---|-------|
| Automobiles | 4 1/2 | a | 4 3/4 |
| Bicycles, pneumatic | 3 | a | 3 1/2 |
| Wagon and carriage, solid | 4 1/2 | a | 4 3/4 |
| Inner tubes | 16 | a | 17 |

DOMESTIC SCRAP



Conventions of Interest to the Trade

National

- February 17-18—at Chicago, Ill. National Builders' Supply Association at Hotel LaSalle.
- March 2-7—at New Orleans, La. National Brick Manufacturers' Association, Twenty-eighth Annual Convention at Hotel Grunewald. William Allen, manager of convention and tourists' division of the Association of Commerce, is preparing for event. T. A. Randall, Secretary.
- March 4-5—at Buffalo, N. Y. National Wholesale Lumber Dealers' Association. A. W. Kreinheder, President of Buffalo Lumber Exchange, is interested.
- April 22-25—at Savannah, Ga. Convention of National Drainage Congress. Edmund P. Perkins, Chicago, Ill., President.
- June 15-19—at Minneapolis, Minn. National Wholesale Grocers' Association. Harry K. Huntton, Stillwater, is interested.
- July 7-9—at New York City. Annual Convention of National Leather and Shoe Finders' Association. Merchants' Association will probably prepare for the event.
- May—at Indianapolis, Ind. Convention National Retail Hardware Association. M. L. Corey, Secretary, Argos, Ind.

STATE

- February 17-19—at Milwaukee, Wis. Retail Lumber Dealers' Association at Hotel Wisconsin. Adolph Pfund, Secretary.
- February 17-19—at Parkersburg, Va. Virginia Retail Hardware Association to convene. A. A. Doak, Crafton, W. Va., is Secretary.
- February 17-20—at Rochester, N. Y. Retail Hardware Association of New York to convene and hold exhibit in City Exposition Building. John B. Foley, of Syracuse, Secretary.
- February 17-20—at Lincoln, Neb. Nebraska Retail Hardware Association to convene. Exhibit to be held at Lincoln Auditorium. Nathan Roberts, Secretary.
- February 17-20—at Des Moines, Ia. Convention and exhibition Iowa Retail Hardware Association at Des Moines Coliseum. A. R. Sale, Secretary.

JANUARY MEETING MOTOR TRUCK CLUB OF AMERICA



SINCE the annual meeting last month and the election of officers, the club has slightly changed its policy in regard to the meetings, and for the present the dinners have been dispensed with, and the club will now have purely a business meeting in the evening.

The first of these was held on Wednesday evening, January 21st, at 8, in the handsome new building of the Locomobile Company of America, on 61st Street near Broadway, New York City.

The meeting was called to order by President George Duck, there being an unusually large attendance. This is probably accounted for by the fact that the members of the Electric Vehicle Association of America, as well as owners and prospective owners of trucks, were invited. Secretary Howland made a few remarks and called attention to the fact that there had been some difficulty in incorporating the club owing to the fact that they propose to assist in educating drivers, and therefore the board of regents at Albany had to be consulted before the incorporations went through on Monday, January 19th. He also mentioned that since the last meeting nineteen new members had joined. Treasurer Machol then made a statement as to the club funds, which was very gratifying.

The speaker of the evening was S. V. Norton, manager of the truck tire sales of the B. F. Goodrich Company, who came all the way from Akron, O., to deliver an il-

The list of conventions given herewith is published each month so that commercial car manufacturers can communicate with the proper authorities with the idea of arranging to give lectures, illustrated talks, statistics, etc., to show the advantage of motor trucks in these various lines; also possibly to show and demonstrate their cars.

- February 17-20—at Kalamazoo, Mich. Michigan Retail Hardware Association to convene at New Burdick Hotel. Exhibit to be held at State Armory. J. Charles Ross, manager.
- February 18-20—at Fargo, N. D. Retail Hardware Association Convention. C. N. Barnes, Secretary, Grand Forks.
- February 24-27—at Minneapolis, Minn. Convention Minnesota Retail Hardware Association. H. O. Roberts, Secretary.
- February 24-26—at Wichita, Kans. Interstate Thrashers' Association will hold annual convention.
- February 24-26—at Toledo, Ohio. Ohio Hardware Association to convene. James B. Carson, Dayton, is Secretary.
- February 25-27—at Lexington, Ky. Kentucky Retail Hardware Association. Convention and Exhibit. J. M. Stone, Sturgis, Ky., Secretary.
- March—at San Francisco, Cal. Convention of California State Retail Dealers' Association.
- March 2-5—at Boston, Mass. New England Retail Hardware Association. Convention and exhibit will be held in Horticultural Hall. D. Fletcher Barber, of this city, is Secretary.
- March 2-5—at New Orleans, La. Building Brick Association of America. H. Jerome Lee, 481 Marbridge Building, New York City, Secretary.

lustrated lecture on the story of truck tires from the jungle tree to the finished product.

The various abuses of truck tires, and their results were shown graphically on the screen, and at the close a most interesting discussion was participated in, Mr. Norton answering the various questions asked him.

Arthur J. Slade, a consulting engineer of New York, read a short paper on the subject, which was followed by a general discussion, taken part in by many of those prominent in the industry. Dan Swander, manager of the Firestone Tire Company of New York, and other tire men, present, participating. The subject of trailers and their effect on tires was brought up. It was Mr. Swander's opinion that a truck regularly used with a large trailer should be fitted with a one size larger tire to make up for the additional wear due to greater tractive effort and braking strains. R. M. Lloyd desired to know more about anti-skid devices that did not damage tires, and asked for information as to the best methods of attaching same. Mr. Norton stated that he did not care to give the impression that anti-skid devices did not damage tires, and said, "they were all injurious to a certain extent, but that those which gradually crept around the surface of the tire and do not remain stationary are least injurious."

In connection with driving and braking strains, Winthrop Waite, of the Packard, asked for information concerning the effect on the tires of braking when a trailer was used, but there seemed to be very little information on this subject.

In connection with the effect of unsprung weight, such as that on the tires caused by the use of a heavy axle enclosing a worm

drive, Mr. Lloyd stated that the tests which he had made showed that 1 lb. of unsprung weight on the axle was equivalent to 4 lbs. in the truck body, as far as the power required to drive on macadam road was concerned, and showed that the difference in weight between such an axle and any of the ordinary types could very easily be offset by weight distribution on the axles.

Mr. Westlake, of the Goodyear Company, then spoke, followed by Mr. Manley, well known as designer of the Manley Hydraulic Transmission. He gave some interesting figures on tire efficiency.

George Pride brought up the question as to why two tires of the same make operating under like conditions in every respect as far as possible could show such a difference in mileage, one, for instance, giving three thousand against another's fourteen thousand. This was answered by pointing out that many things might enter into such a result, namely, the difference in the age of the tires, slightly bent axles, or steering connections, driving in car tracks where one wheel would get very different road conditions from another, difference in handling by different drivers, etc.

William J. Chipman brought up the question of how far down toward the rim it was advisable to wear a solid tire. This was answered by Mr. Norton by saying that it was up to the truck user. The closer the tire was worn to the rim, the greater the effect on the truck itself in the way of vibration, and it was limited only by the amount of damage that could be stood by the user in the way of frame breakage, jarring to pieces of the machinery, lamps, etc.

March 3-5—at Sioux Falls, S. D. Retail Hardware Association of South Dakota. E. C. Warren, of Pierre, S. D., Secretary.

March 6-7—at Milwaukee, Wis. Wisconsin State Laundrymen's Association to convene in Republican House. Business Men's Association is preparing for event.

March 10—at St. Paul, Minn. Minnesota General Merchants' and Retail Grocers' Association will hold annual convention at Hotel Ryan.

March 10-21—at Tacoma, Wash. Tacoma Retail Grocers' Association will hold pure food show in Glide Rink, South 11th and L Streets.

March 11-12—at Philadelphia, Pa. Annual convention of Pennsylvania, New Jersey and Delaware Wholesale Grocers' Association to be held, with headquarters at Hotel Adelphia.

April—at Albany, N. Y. Convention of New York State Embalmers' Association. William S. Drinkwater, New York City, President.

April 7-9—at San Antonio, Tex. Lumbermen's Association of Texas to convene. The association's headquarters are at Houston.

May 5-7—at Little Rock, Ark. Retail Hardware Association of Arkansas, to convene in this city. Grover T. Owen, of this city, is Secretary.

May 26-27—at New York City. Board of Governors of the American Manufacturers' Association will hold convention. Merchants' Association will probably have charge of the event.

June 1-6—at Topeka, Kans. Topeka Retail Grocers' Association will hold pure food show. Committees are making preparations for show.

June 16-17-18—at Des Moines, Ia. Iowa Retail Merchants' Association will hold annual convention.

July 7-9—at Raleigh, N. C. Retail Hardware Association of Carolina. T. W. Dixon, of Charlotte, N. C., is Secretary.

July 14-16—at Cedar Point, Ohio. Ohio Retail Grocers' & Meat Dealers' Association to hold 15th annual convention.

October 12-17—at Birmingham, Ala. Alabama State Fair to be held. Sam Fowlkes, Secretary of the Alabama Fair Association, is preparing for event.



FEDERAL MOTOR TRUCK COMPANY'S DEALERS' BANQUET

On January 21st, at 7.30 P. M., a banquet was given by the Federal Motor Truck Company of Detroit, at the Hotel Cadillac, to fifty of its visiting dealers. The banquet concluded a three days' convention, and the dinner itself was one of the most elaborate ever given on an occasion of this nature. The big feature of the evening was the rendering of an original one-act sketch, by Kirk B. Alexander, in which the eccentricities of both dealer and factory officials were burlesqued.

At the conclusion of the dinner the National Federal Dealers' Association was organized to bring the dealers closer together, foster the spirit of co-operation and to improve service to the truck owners. The following officers were elected: Allan Baker, of St. Louis, president; William L. Hughson, San Francisco, vice-president; C. T. Chenevert, assistant sales manager with headquarters in New York City, secretary; and H. S. Dunlavey, of Chicago, treasurer.

Walter Shulman has resigned his position with the Cordeaux-Etter Manufacturing Corporation, of Brooklyn, to join The Joseph Dixon Crucible Company, and will make his headquarters at the New York office.

Jack Glazier, well known all over the Pacific coast, and formerly connected with the Leavitt Company in the South, has entire charge of the truck business of the J. W. Leavitt Company, which will occupy a separate building in the spring.

Agency and Branch Items

J. R. Lane, Eureka, Cal., has been appointed Eureka distributor of Jeffery cars and trucks.

Bradley, Earl W., of the Motor Mart, Superior, Wis., has secured the agency for the Kelly truck.

Rouze, C. F., 1733 McGee Street, Kansas City, Mo., has secured agency for the Mack and Saurer cars.

Reliable Motor Car Company has opened new garage and machine shop at 5th and Poplar Streets, Poplar Bluff, Mo.

Jeffery Auto Sales Company, of San Francisco, has opened a branch at 16th and Alder Streets, Portland, Ore., in charge of H. A. Burgess.

General Motors Truck Company, Detroit, has opened a branch at 123 Washington Street, Newark, N. J., which is subsidiary to the New York branch and under the management of A. J. Marshall.

Skellet Company, Minneapolis, Minn., has taken the agency for the Kelly truck. George LaBelle, for many years identified with the truck industry, will have active charge of the truck department of the Skellet Company.

Howell's Wilcox Trux Sales Company, Baltimore, Md., has changed its name to the Howell Motor Truck Company. New quarters have been taken at 910 Bolton Street, where there are 4000 sq. ft. of floor space, and every modern facility for handling and repairing the truck the company sells.

Willys-Service Corporation, Inc., 427 W. 42d Street, New York City, which formerly handled Willys-Utility wagons, has changed its name to the Gramm Service Corporation, Inc. The company, while it sells Gramm trucks, specializes in truck service.

Locomobile Company of America, which recently moved its service, mechanical and financial departments to its new building on 61st Street west of Broadway, New York City, has now moved the sales department to new building from Broadway and 75th Street.

White Company, Cleveland, Ohio, has opened a branch at 3420-22 Lindell Avenue, St. Louis, Mo., having disposed of its dealership in that city. The new branch is under the management of Herbert N. Rosenberg, formerly connected with the Chicago branch.

Kissel Motor Company and the McDuffee Automobile Company, Chicago, have combined, and the business will hereafter be conducted under the latter name. Both the sales and service building of the Kissel Motor Company and the McDuffee Automobile Company will be conducted as at present, but it is decided to eventually use the former exclusively for the sale and care of trucks.

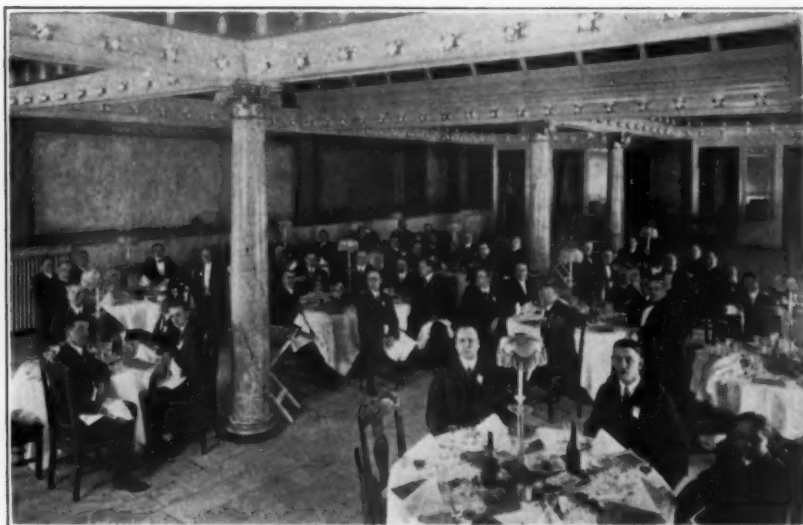
FIRESTONE SHIFTS MEN

Having made J. F. Cast, its former Cleveland manager, special commercial tire representative in Ohio and Indiana, the Firestone Tire and Rubber Company, of Akron, has named P. B. Talbott, Dallas manager, to succeed the Cleveland manager. The changes are to be put into effect immediately. Cast will devote all his time to manufacturers in the Cleveland, Columbus, Cincinnati and Indianapolis territories.

H. W. McFadden, Houston manager, will take Talbott's place in Dallas and will be known as Texas manager. G. C. Faling, who has been traveling for the company in Texas, will succeed McFadden at Houston.

Broadway Garage, Broadway and 13th Street, San Diego, Cal., formerly owned by P. M. Price, has been sold to Edward F. Jedlan, of Chicago, with the agencies of I. H. C. truck and Overland car.

The H. J. Koehler S. G. Company, 1709 Broadway, New York City, has just issued a very complete catalog in attractive covers, which pictures and describes in detail the ten stock body types of the \$750 Koehler one-ton truck. Besides illustrations of the different complete models, various parts of the mechanism are shown with about twenty-five illustrations, and the selling prices of not only complete models, but of the accessories, body lettering and different forms of special work are given. This catalog will be sent upon request.



Banquet of the Federal Motor Truck Company's Dealers

AUTOMOBILE SHOWS AT WHICH COMMERCIAL CARS WILL BE EXHIBITED

February 14-21—Pittsburgh, Pa. Pittsburgh Auto Show Association, Incorporated. J. H. Zimmerman, manager, 130 N. Highland Avenue.
 February 16-21—Toronto, Canada. Armory. Toronto Auto Trade Association.
 February 16-22—Kansas City, Mo. New Convention Hall. Kansas City Motor Car Dealers' Association. E. E. Peake, Secretary, 909 Gloyd Building.
 February 18-21—Bloomington, Ill. McLean County Auto Club.
 February 21-28—Newark, N. J. New Jersey Automobile Exhibition Company. H. A. Bonnell, manager, 1022 Kinney Building.
 February 22-28—Elmira, N. Y. Elmira Automobile Club. M. D. Marks, manager, 210 E. Water Street.
 February 22-March 1—Hartford, Conn. Hartford Auto Club. F. Dart, chairman. Park Casino.
 February 23-28—Bangor, Me. Auditorium. A. P. Pierce, manager.
 February 23-28—Wichita, Kans. Forum. Wichita Business Association. R. H. Faxon.
 February 23-28—Indianapolis, Ind. Indianapolis Auto Trade Association. F. Ellis Hunter, Secretary.
 February 23-28—Omaha, Neb. Omaha Automobile Show Association, Inc. C. G. Powell, Secretary.
 February 24-28—Syracuse, N. Y. Armory. Syracuse Auto Dealers' Association. Harry T. Gardner, manager.
 March 2-4—Cincinnati, Ohio—Music Hall. Cincinnati Auto Dealers' Association. E. A. Kruse, Secretary, 808 Sycamore Street.
 March 2-7—Fort Dodge, Ia. Fort Dodge Auto Dealers' Association. Auditorium.
 March 2-7—Ottawa, Canada. Ottawa Valley Motor Car Association. P. E. Watson, manager.
 March 3-14—Tiffin, Ohio. Auditorium. E. T. Rodgers.
 March 5-7—Elgin, Ill. Otis W. Hoyt, 56 River Street. Coliseum.
 March 7-14—Harrisburg, Pa. Chestnut Street Auditorium. Harrisburg Auto Dealers' Association.
 March 7-14—Hamilton, Ont., Canada. New Armories. R. M. Jaffray, manager, 102 Clyde Block.
 March 17-21—Boston, Mass. Boston Commercial Motor Vehicle Association. C. I. Campbell, Secretary.
 March 23-30—St. John, Canada. New Brunswick Auto Association. E. M. Wilcox, manager, 62 Temperance Street, Toronto.
 April 9-15—Manchester, N. H. Mechanics' Hall. D. F. Sullivan.
 May 4-9—Deadwood, S. D. Auditorium. George D. Kilkes.

OVERSIZE TIRES

Many owners of small capacity commercial cars using pneumatic tires have heard a good deal about the economy of using oversize tires. While their first cost is more, oversize tires give much greater mileage in proportion to their cost than regular size tires and hence cost less per mile.

For the convenience of persons desiring to change sizes, we give the following table which shows the two sizes which fit each rim.

| Diam. of Rim. | Regular Size Tire. | Oversize Tire. |
|---------------|--------------------|----------------|
| 22 | 28x3 | 29x3½ |
| 24 | 30x3 | 31x3½ |
| 23 | 30x3½ | 31x4 |
| 25 | 32x3½ | 33x4 |
| 27 | 34x3½ | 35x4 |
| 29 | 36x3½ | 37x4 |
| 26 | 34x4 | 35x4½ |
| 28 | 36x4 | 37x4½ |
| 25 | 34x4½ | 35x5 |
| 27 | 36x4½ | 37x5 |
| 29 | 38x4½ | 39x5 |
| 31 | 40x4½ | 41x5 |
| 33 | 42x4½ | 43x5 |
| 35 | 44x4½ | 45x5 |
| 25 | 36x5½ | 37x6 |
| 27 | 38x5½ | 39x6 |
| 29 | 40x5½ | 41x6 |
| 31 | 42x5½ | 43x6 |

There has been established between Fresno and Madera a motor bus line, and three trips are made each way daily at the one-way fare of 75 cents, which is only 10 cents more than the railroad fare.

BOUGHT TWENTY-SIX WHITE TAXICABS

New York's taxicab legislation which abolished the exclusive hotel privileges and gave the police department power to regulate cab stands, has furnished the incentive for a number of new concerns to start business. One of the new entrants is the Taxicab Association, Ltd., which recently began business with an equipment of twenty-six White cabs.

The president and manager of the Taxicab Association, Ltd., is M. Bundy Cole, who, for a number of years, was manager of the National Bank of Nicaragua, and who completed the change of the monetary system of Nicaragua from paper to gold. The vice-president is C. A. Jones, president of the Nicaragua Railway Company.

Other companies will enter the New York taxicab field in the near future. One concern, which is now being organized, will start business on a bigger scale as soon as the necessary headquarters and equipment can be procured. Smaller enterprises have been numerous since the new legislation took effect.

Eisemann Magneto Company, Brooklyn, N. Y., has opened the following Eisemann service stations: Philadelphia Magneto Repair Company, 1429 Spring Garden St., Philadelphia; H. G. Zimmerman, Walnut & Linden Sts., Harrisburg, Pa.; P. Melchior Machine Works, 1218 Howard St., Omaha, Neb.; Storage Battery Service Company, 1525 Broadway, Seattle, Wash.;

Bissingers Magneto Exchange, 1611 Prospect Ave., Cleveland, Ohio; McCarthy Bros. & Ford, 41 E. Eagle St., Buffalo, N. Y.; Auto Supply Company, 42 S. 2d St., Memphis, Tenn.; Chas. Rubel & Company, 1312 14th St., N. W., Washington, D. C.; Archer-Wiggins Company, 6th and Oak Sts., Portland, Ore.

Agencies Wanted

Under this heading we publish each month dealers or prospective dealers who desire to take agencies for commercial cars. Dealers desiring to take advantage of this department should send in their names and addresses to the Editorial Department before the 5th of the month. This service is entirely without charge. Notices will be repeated only upon written request. Manufacturers when writing these firms will confer a favor by mentioning this journal.

John Schaffer, Wanda, Minn., is interested in taking the agency for a farm truck and light delivery car.

Thomas Motor Car Company, 110 Princeton Avenue, Youngstown, Ohio, will consider taking the agency for trucks from a light delivery car to a five-ton truck.

L. F. O'Donnell, 315-17 E. State Street, Jacksonville, Ill., is prepared to take the agency for a light truck of four-cylinder type, shaft drive, sliding gear transmission and price of about \$700.

B. H. Kamp Motor Company, 2nd and Main Streets, Mt. Carmel, Ill., desire to take the agency for one and two-ton trucks and a light cheap cyclecar delivery car. They have a number of prospects for the above.



Stegeman's New England Home

The Stegeman Motor Car Company, Milwaukee, has secured as its New England representatives, Richard A. Brine, who has been connected with the industry for thirteen years and is well known to the New England trade, and Frank R. Brine, of Boston, who have incorporated a new company under the name of "The Stegeman Motor Truck Company of New England." This company is the distributor of the entire Stegeman line for the States of Maine, New Hampshire, Rhode Island, eastern half of Vermont and the eastern half of Massachusetts. A new building, recently erected, houses the very complete sales rooms and service station. About ten thousand square feet of floor space is occupied by them and they are thus enabled to give perfect service to all "Stegeman" users. The building is located in the heart of the automobile section of Boston, at 922 Commonwealth Avenue, one of the most traveled thoroughfares of that city.

GROCERS OF MIDDLE WEST USING TRUCKS FOR RETAIL DELIVERY

Figures Showing Cost of Operation

Most users of motor driven vehicles have ceased to look upon cost as being the supreme test or measure of the efficiency of the truck. Mere dollars and cents cannot be made to measure the value of such vehicles. They now recognize the value of the truck on account of its better transportation possibilities. However, as these possibilities are quite widely recognized, and there are still a few who are not so sure of the cost figures, the following information and statistics gathered by a Chicago grocery publication will be of interest.

Such comparisons measure the truck by horse standards, and this of course is not entirely fair to the truck, because it cannot be measured in any such way. However, as horse standards are more commonly understood than any other by those studying this situation, the following figures taken from the books of the grocers themselves will be of interest.

Net result of A's experience:

Four horses and single wagons at \$400 to \$425 \$1,600 to \$1,700
Two auto delivery wagons, at \$1,000 \$2,000

Maintenance cost—Wagons:

Four delivery boys, at \$13.50 per week \$54.00
Keep of four horses, feed, etc., at \$25 per month 25.00

Total per week \$79.00

Maintenance cost—Automobiles:

Two delivery boys, at \$13.50 per week \$27.00
Fuel, repairs, etc., two machines, at \$15 per month 7.50

Total per week \$34.50

Reduced to a year's expense, the comparative cost of maintenance of five wagons and the two automobiles which did the same work, based on these figures, would be about as follows:

| Item— | Auto. | Wagons |
|-------------------------------|---------|---------|
| Wages for men | \$1,400 | \$2,808 |
| Upkeep, feed, fuel, etc. | 300 | 1,300 |
| Total | \$1,700 | \$4,108 |

B, in a prominent Iowa city, was converted a number of years ago to the advantages of automobile delivery. He has long since demonstrated to his own satisfaction that one of his automobile delivery cars will easily do the work of two wagons, and that the one machine gives much quicker and more satisfactory service.

C is a merchant in a New York town who abolished his three wagons and put in their place one delivery car. At the end of the first year, he found that he had delivered his goods in better time, better shape and principally at a cost of one-half of what it cost him to deliver the same quantity of goods by wagon.

His figures follow:

| | |
|------------------------------|-------|
| Gasoline | \$180 |
| Oil | 36 |
| Renewals of batteries | 4 |
| Repairs and repainting | 75 |
| Replacement of tires | 225 |
| Drivers' wages | 600 |
| Miscellaneous | 30 |

Total maintenance and operating expense of one machine for one year.. \$1,150

Horses and wagons:

| | |
|---|-------|
| Care, feed, shoeing and veterinary | \$720 |
| Repairs to wagon and harness and repainting | 110 |
| Three drivers' wages at \$2 per day | 1,800 |

Total maintenance and operating expense of three horses and wagons for one year \$2,630

A merchant in a smaller town in Ohio kept exact tab on each trip, the number of daily trips, the distance covered, length of time consumed in covering that distance, number of packages delivered, and the amount of gasoline and engine oil used. The averages were found to be as follows:

| | |
|---|-------|
| Average daily trip, miles | 6 |
| Time for each trip, hours | 4½ |
| Average number of packages per trip | 138 |
| Gasoline consumed per trip, 4¼ gals. | .62c |
| Engine oil | 1 qt. |

X & Company, a firm of grocers doing business on the South Side of Chicago, have adopted as the principal medium for the delivery of the groceries sold by their two stores, two automobile delivery wagons, and find that they get away with the goods. It formerly required six wagons to do the work which is now handled nicely by these two machines.

TRUCK HAULING SHINGLES UNDER GREAT DIFFICULTIES AND PROVING ECONOMICAL

That motor trucks are not only available for economic transportation in cities and on improved roadways is demonstrated by information received by the Garford Company, of Elyria, Ohio, from the Waterhouse Trading Company, Seattle, Wash., distributors of Garford Trucks. The collection of material sent by the western concern is intensely interesting, for it shows the motor truck working under new and almost unbelievably difficult conditions. The two-ton Garford which is owned by the Drury & Brown Shingle Company, of Sequim, Wash., has been in service 8 months, hauling capacity loads of shingles from the owner's mill, 18 miles up the side of a mountain, to the village of Sequim. Though there are grades in these 18 miles as steep as 20 per cent. and the road is a typical mountain trail, the truck has never missed a trip since it has been in service. It has reduced the cost of getting out these shingles, by more than 50 per cent. since horses and wagons were discarded.

"The operation of this shingle-hauling Garford is the best demonstration of the adaptability of the motor truck, possible," writes the manager of the Waterhouse Trading Company in his letter to the manufacturers. "For 8 months it has been hauling shingles from a point very close to the line of perpetual snow over roads so bad that their condition is almost unbelievable, and never once has it missed a trip."

In some places the grade is a 20-per cent. one and more than two-thirds of the distance is simply a conglomeration of sand, mud and water, and rough rocks, with two or three crude bridges crossing mountain streams, and in one place the trail leading through the sandy bed of a dry stream. The illustrations give an idea of what is encountered in the way of bad roads, showing a mudhole in which the water is hub-deep all the time.

"The natural dirt road is an especially difficult one, being made up of soft, mushy soil and covered deep with decayed vegetation, the results of years and years of deposit from the primeval forest through which the trail runs.

"When the sale of this truck was made, we had no idea of the condition of the road it would have to travel and we feared for a time that our salesman had been over-enthusiastic. In short, we did not dare hope that any truck could make this trip twice daily and give satisfactory service. Therefore, the fact that the Garford has never been out of commission for an hour since it went into service is especially pleasing to us."

Stewart-Warner Speedometer Corporation, Chicago, has a guarantee whereby it agrees to repair or replace at its factory branch houses or any authorized service station any instrument or part that proves defective in material or workmanship within one year from date of sale to the car buyer, provided transportation charges are prepaid, where shipment of instrument or part is necessary.

Packard Motor Car Company recently sold thirteen trucks to the Union Ice Company, in San Francisco, making a total of twenty-six Packard trucks operated by that concern.



One of the Stiff Grades

This two-ton Garford carries a capacity load of shingles up grades of twenty per cent

SYSTEMATIC CULTIVATION OF MOTOR TRUCK "PROSPECTS"

By HUGH DOLNAR



THE competent truck Sales Agent studies every transportation problem in his territory, studies the man who controls each horse transportation plant, makes his acquaintance, watches his methods and seeks to convert the horse traction user into a motor truck "Prospect," that is to say, a Horse Traction User who has become fully impressed with the idea that his transportation might possibly be better and more cheaply performed by mechanical propulsion than by the muscular exertions of horses, as it undoubtedly can be in every case and instance if the Horse Traction Man can be educated to the point of seeing the great light.

When the Horse Traction Man has reached the mental condition of a Motor Truck "Prospect" the truck salesman's task becomes easy—his intended purchaser is, in his own mind, already a Motor Truck User, convinced that mechanical traction is quicker, surer, and cheaper, than horse traction and the Motor Truck Salesman has only to present his good Motor Truck to the willing Prospect to effect an exchange of values which is beneficial to both parties, deliver the Motor Trucks to his Prospect and walk off with the cash in his pocket.

It thus appears that the first aim and object of the really live Motor Truck Salesman is to increase the crop of Prospects in his own territory, and that the Sowing of Prospect Seed and careful cultivation of the budding Prospect when the sown seed has germinated, is the one best procedure in Motor Truck Selling.

How can the Sales Agent of a good line of motor trucks grow his crop of Prospects soonest?

This vital question is answered by J. E. Hannon, General Manager of The O. K. Motor Truck Company, of Detroit, Mich., as follows: The Motor Truck Salesman selects certain possible users of Motor Trucks, studies their individual local transportation problems in the light of the Salesman's past motor truck service experience, collects and arranges pertinent past transactions, and then approaches his intended Prospect with the proposal to perform the Prospect's local transportation with the Salesman's own trucks for a day, at no greater cost to the Prospect than his own Horse Traction in the past, thereby enabling the Motor Truck Salesman to present actual time and cost details of Motor Truck Performance to the Prospect in plain, black-and-white figures, proven by actual work performed in the daily business of the Prospect.

Here the Motor Truck Sales Agent's own past experience comes into play. He must know what capacity car will most economically transport the tonnage over the several routes travelled as expeditiously as possible; he must know whether that particular transportation problem can be best handled by one, two, or three-ton trucks or by a small fleet of one-half-ton trucks, which knowledge is gained by past experience under like conditions guided by

an intimate knowledge of the routes to be covered, road conditions and distribution of tonnage to be transported, and so to be able to fit the conditions of this particular job with the right capacity trucks.

Here the "Collective Experience" feature of Mr. Hannon's well considered "Prospect Cultivation" scheme comes into play.

Every Sales Agent of the O. K. Trucks is instructed to prepare a detailed report of each individual demonstration of the one-day trial delivery by Motor Truck made in Prospect Cultivation, and to forward every report direct to The O. K. Motor Truck Company's transportation Department, which undertakes to arrange and tabulate the useful information contained in these individual Truck Trial reports, and place the information thus obtained by each selling agent in the hands of every O. K. Truck Sales Agent, so that the knowledge of it becomes the property of all.

No Individual Sale of Motor Trucks to one individual purchaser is without its own enlightening and illuminating features, and by the specified distribution of knowledge thus gained Mr. Hannon proposes to reduce Prospect Cultivation to a scientific basis, by placing the condensed information in the hands of all O. K. Truck Salesmen, so that the light of past successes may clearly illuminate the best path for future efforts in Motor Truck Salesmanship.

In a word, Mr. Hannon proposes not to wait for the comparatively slow natural growth of Prospects, but to force the growth of the Prospect Crop by truly scientific culture along the lines here briefly outlined, and Mr. Hannon's plan of procedure as here sketched seems well worthy of the most careful consideration by Motor Truck Manufacturers at large.

THE PASSING OF THE HORSE

The view that the horse is being supplanted by the commercial motor car seems justified by statistics issued from the State House of Massachusetts.

These figures show the number of horses assessed in Massachusetts to have steadily fallen off as follows:

| | |
|------|---------|
| 1900 | 194,598 |
| 1901 | 189,955 |
| 1902 | 188,608 |
| 1903 | 187,148 |
| 1904 | 183,346 |
| 1905 | 181,470 |
| 1906 | 180,238 |
| 1907 | 179,175 |
| 1908 | 174,750 |
| 1909 | 169,607 |
| 1910 | 165,632 |
| 1911 | 164,192 |
| 1912 | 160,719 |
| 1913 | 156,933 |

These figures show that there has been a decrease in the number of horses in Massachusetts in the last fourteen years of 37,665, or nearly 20 per cent. With the exception of Suffolk County, which includes Boston, Chelsea, Revere and Winthrop, this decrease has been fairly uniform over the State. Thus Middlesex County, including the cities of Cambridge, Everett, Malden, Newton, Somerville, Waltham and Woburn, had 37,226 horses in 1900, and 27,421 in 1913. In Worcester County there were 31,555 in 1900 and 23,534 in 1913. Plymouth County showed a decrease from 11,857 in 1900 to 9,279 in 1913. The city of

Lynn had 2415 horses in 1900 and 1633 in 1913. Fall River had 3552 horses in 1900 and 2588 in 1913.

In Suffolk County in 1900 there were 16,621 horses. This number increased up to 1907, when there were 19,186. There was a decrease to 17,323 in 1910 and an increase to 18,534 in 1913. This shows a net decrease of 1652 since 1907. There is no doubt that the large number of horses utilized in subway construction and other large public works has complicated somewhat the situation in Boston, but the fact remains that there has been a decrease of about 9 per cent. in the number of horses used in Suffolk County within the last six years.

When we look for the reason for this condition of things we find it in the statistics of the Massachusetts Highway Commission of the number of motor vehicles registered in this State. Registration began September 1, 1903, when the number of motor vehicles registered was 3241. This number increased to 16,739 in 1907 and to 62,660 in 1913. There was an increase in seven years in the number of motor vehicles of 364.3 per cent. It was not until 1911 that separate registration was made of motor commercial vehicles. The registration of these vehicles for the last three years has been as follows:

| | |
|------|------|
| 1911 | 2189 |
| 1912 | 4036 |
| 1913 | 5948 |

The number of commercial vehicles registered increased over 75 per cent. in 1911-12 and 47.3 per cent. in 1912-13. Assuming that anything like the same relative decrease in the number of horses and increase in the number of motor vehicles holds good for the next two years, it is safe to assume that by 1915 the number of horses in the State will drop below 150,000 and the number of motor vehicles increase to over 75,000, while the number of commercial vehicles will be approximately 15,000.



The Lincoln Highway Pump

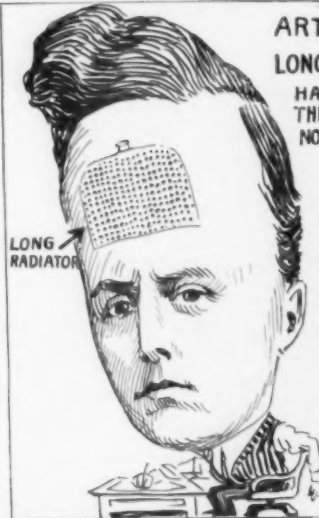
Believing that autoists as well as dealers and garagemen who handle gasoline would appreciate any guideposts which might be placed along the route of the Lincoln Highway has led S. F. Bowser & Co., of Fort Wayne, Ind., to design the outfit illustrated. This equipment will be sold only to those located on the exact route mapped out as the highway, and no others.

CCJ GALLERY of SALES MANAGERS

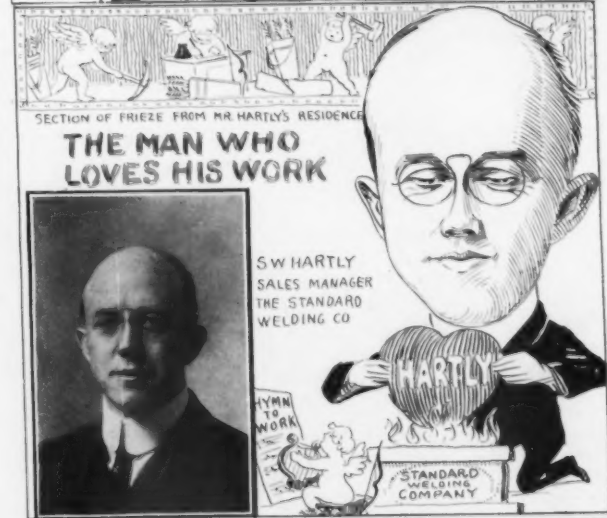
GEO. ROTTWEIER - CROWN COMMERCIAL CAR CO., NORTH MILWAUKEE, WIS.



ARTHUR L. SWANK
OF THE
LONG MANUFACTURING CO.
HAS A LONG HEAD FOR COOLING
THE OUTPUT OF HOT AIR MERCHANTS
NO WONDER THE AUTO MAKERS
LIKE HIM.



GEO. D. WILCOX
SALES MGR.
STANDARD MOTOR TRUCK CO.
DETROIT, MICH.



W.H. MOORE
GEN'L SALES MGR.
THE GRAMM-BERNSTEIN
COMPANY
LIMA,
OHIO.

NEVER
"SPARES"
HIS
COMPETITORS



ONE OF THE FOUNDERS OF THE REPUBLIC -

WM. HOGLE, SALES MGR.



OF THE
ALMA
MOTOR
TRUCK CO.
AT DETROIT



Buyers' Information Commercial Car Review

(Western Section)

On the following pages is given a complete review of the Commercial Car Models which will be manufactured for the coming season by Western American Manufacturers.

See Complete Indexes on Pages 46 and 47

THIS is the second or Western Section of the Review, and includes cars manufactured in the following States: California, Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Texas, Utah and Wisconsin.

The first or Eastern Section of this Review was issued January 15th, and contained a Review of cars made in the following States: Connecticut, District of Columbia, Kentucky, Maryland, Massachusetts, New York, New Jersey, North Carolina, Ohio and Pennsylvania.

The data given in this Review was supplied direct by the makers, and is as correct as can be obtained. Any omissions or inaccuracies which occur are due to imperfect information given us by makers.

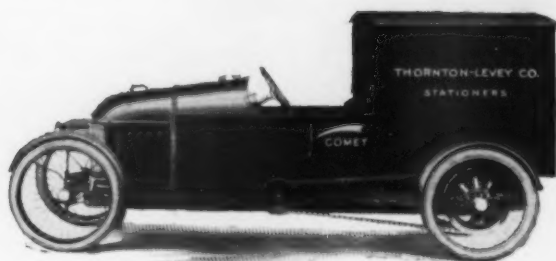
Key to Abbreviations will be found on the leaf attached to this page; when this is opened out it will be found very convenient to refer to, no matter which pages of the Review are consulted. Indexes will be found on pages 46 and 47.

Suggestions and Criticism of this Buyers' Information Review are invited. We want to know whether it meets requirements and how it can be made better, if possible.

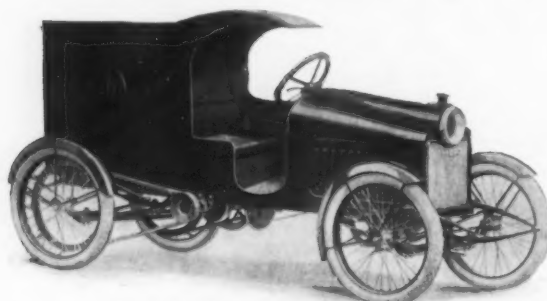
Horse-Power Formula.---All horse-powers are calculated by the S. A. E. formula: $H. P. = \frac{D^2 N}{2.5}$; 2-cycle engines by the modified formula, $H. P. = \frac{D^2 N}{1.515}$ where D=bore in inches and N=number of cylinders.



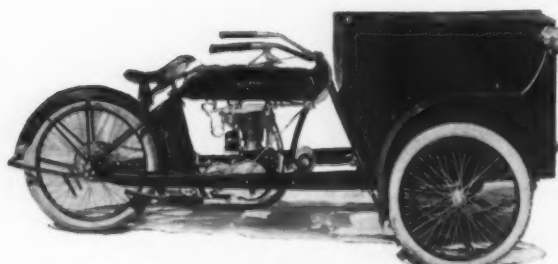
IMP. MODEL X. 300-LB. PANEL BODY, \$395.



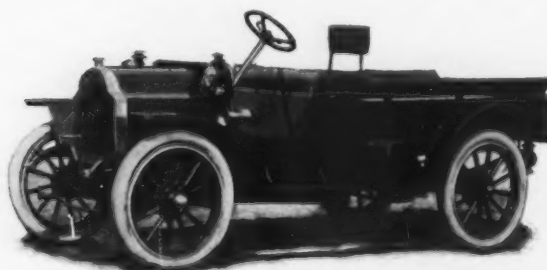
COMET MODEL C. 300-LB. BOX BODY, \$450.



MERZ 500-LB. PANEL BODY, \$485.

MINNEAPOLIS 500-LB. BOX BODY TRICAR, \$395.
Carrying space, 30x36x28 in.

WAGENHALS 750-LB. BOX BODY TRICAR, \$690.



COMMERCE MODEL KA, 1000-LB. FLARE BOARD, \$950.



COMMERCE MODEL KC, 1000-LB. PANEL, \$975.

300 Pound Gasoline

| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P'm | Maximum Speed | Horse Power | Cylinders | Bore | Stroke | Cylinders Cast | Cooling | Radiator |
|--|----------------|---------------|------------------------------|-----------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|
| Comet Cyclecar Co., Indianapolis, Ind. | | | | | | | | | | | | |
| C | 450 | *450 | 10 40 10 | 2 | 3.5 | 3.67 | S | A | .. | | | |
| Imp Cyclecar Co., Auburn, Ind. | | | | | | | | | | | | |
| X | 600 | *395 | .. 25 | 9 | 2 | 3.33 | 3.88 | S | A | .. | | |
| Shapiro Michaelson Motor Car Co., Minneapolis, Minn. | | | | | | | | | | | | |
| .... | .... | .... | 26x40x25 | 20 | .. | 5 | 1 | 3.5 | 3.75 | S | A | .. |
| .... | .... | .... | 26x40x25 | 20 | .. | 10 | 12 | 3.5 | 2.75 | S | A | .. |

500 Pound Gasoline

| | | | | | | | | | | | | |
|--|------|------|----------|----|----|------|---|------|------|----|---|----|
| Auburn Motor Chassis Co., Auburn, Ind. | | | | | | | | | | | | |
| Jr. | 1100 | .... | .. 18 | 11 | 2 | 3.75 | 4 | S | A | .. | | |
| Harley-Davidson Motor Co., Milwaukee, Wis. | | | | | | | | | | | | |
| M'cle Tr. | 600 | 425 | .... | 19 | 30 | 9 | 2 | 3.31 | 3.5 | S | A | .. |
| Merz Cyclecar Co., Indianapolis, Ind. | | | | | | | | | | | | |
| .... | 750 | *485 | .... | 16 | 25 | 10 | 2 | 3.5 | 3.67 | S | A | .. |
| Minneapolis Motor Co., Minneapolis, Minn. | | | | | | | | | | | | |
| .... | .... | *395 | 42x30x28 | 14 | 25 | 5 | 1 | 3.38 | 4 | S | A | .. |

750 Pound Gasoline

| | | | | | | | | | | | | |
|--|------|------|-------|----|----|------|------|------|------|----|---|----|
| Auburn Motor Chassis Co., Auburn, Ind. | | | | | | | | | | | | |
| H. W'g'n | 1200 | .... | .. 18 | 14 | 2 | 4.13 | 4 | S | A | .. | | |
| Buckeye Mfg. Co., Anderson, Ind. | | | | | | | | | | | | |
| V-1 | 2250 | 900 | .... | 28 | 25 | 23 | 4 | 3.75 | 4.25 | P | C | V |
| Hupp Motor Car Co., Detroit, Mich. | | | | | | | | | | | | |
| L'g't Del. | 1430 | 850 | .... | 20 | 17 | 4 | 3.25 | 5.5 | B | T | H | |
| Wade Commercial Car Co., Holly, Mich. | | | | | | | | | | | | |
| .... | 1200 | 400 | .... | 30 | 12 | 8 | 1 | 4.5 | 6 | S | A | .. |
| Wagenhals Motor Co., Detroit, Mich. | | | | | | | | | | | | |
| .... | 1400 | .... | .... | 28 | 30 | 20 | 4 | 3.5 | 3.38 | P | G | T |

1000 Pound Gasoline

| | | | | | | | | | | | | |
|--|------|------|------|----|----|----|---|-----|---|---|---|---|
| Buick Motor Co., Flint, Mich. | | | | | | | | | | | | |
| S | 2280 | 1000 | .... | 29 | 25 | 14 | 4 | 3 | 5 | B | T | T |
| Commerce Motor Car Co., Detroit, Mich. | | | | | | | | | | | | |
| K | 1900 | 875 | .... | 25 | 14 | 4 | 3 | 4.5 | B | T | H | |

On the other side of this leaf will be found the key to the abbreviations used in the

***Buyers' Information
Commercial
Car Review***

While consulting the Review, turn this leaf out so that it extends beyond the book, it will then be convenient for reference, no matter how many pages you turn to.

Indexes arranged alphabetically and according to price will be found on pages 46-47.

KEY OF ABBREVIATIONS

Used in the Specifications of Cars in the BUYERS' INFORMATION COMMERCIAL CAR REVIEW

Chassis Weight: Given in pounds and includes weight of chassis only.

Price: In the table the prices are for chassis only, unless marked with an asterisk (*), in which case they are complete car prices. In the captions, prices are of the car complete as shown in the illustration, unless otherwise stated.

Horse Power: Calculated by the S. A. E. formula, $H. P. = \frac{D^2 N}{2.5}$; 2-cycle engines by the modified formula, $H. P. = \frac{D^2 N}{1.515}$ where D = bore in inches, N = number of cylinders. * Indicates 2-cycle.

Cylinders Cast: S, singly; P, pairs; B, en bloc; T, in threes; E, singly, assembled en bloc.

How Cooled: A, air; T, thermo-syphon; G, gear pump; C, centrifugal pump; W, water.

Type of Radiator: H, honeycomb; P, planetic; T, tubular; C, cellular; V, vertical.

Carburetor Make: A, Atlas; B, Breeze; BD, Breeze Detroit; BE, Bennett; C, Carter; CH, Chapin; CL, Claudel; CRG, C.R.G.; D, Dayton; E, Excelsior; F, Flechter; FL, Falls; GA, G. & A.; H, Holley; HN, Harroun; HR, Heitger; HT, Hoyt; K, Kingston; KD, KD; KR, Krice; M, Marvel; MA, Macos; MO, Model; MY, Mayer; N, Newcomb; NM, New Miller; O, optional; P, Polyroe; PL, Planhard; R, Rayfield; S, Stewart; SB, Stromberg; SC, Scott; SD, Standard; SI, Simms; SL, Schebler; SP, special; V, Vortex; Z, Zenith; ZP, Zephyr.

Ignition: A, Atwater Kent; B, Bosch; BL, Berling; BR, Briggs; BS, Briggs & Stratton; C, Connecticut; D, Delco; E, Eisemann; H, Heinze; K, Kingston; KW, K-W; LL, Lutz-Lockwood; M, Mea; MI, Michigan; MR, Motsinger; MY, Mayer; N, National; O, optional; P, Pittsfield; PF, Pfanstiehl; R, Remy; S, Simms; SD, Splitdorf; SP, special; SW, Swiss; UH, U. & H.; V, Volta; W, Western Electric; WI, Witherbee; WS, Westinghouse; WY, Wyco.

Spark Plug Size: S, S. A. E.; $\frac{1}{2}$, $\frac{1}{2}$ in. pipe; M, Metric.

(Note) Spark plug sizes: S. A. E.— $\frac{7}{8}$ in. diameter, 18 threads straight; $\frac{1}{2}$ in. pipe size—13-16 in. diameter, 14 threads, tapered; Metric—18 mm. diameter, 1.5 mm. pitch (approx. 23-32 in. diameter, 17 threads).

Style of Drive: B, bevel gear; C, chain; E, electric; F, friction; S, shaft; SP, spur; W, worm; V, V belt.

Style Speed Change: F, friction; H, hydraulic; IC, individual clutch; L, planetary; P, progressive; S, sliding.

Tires: Solid unless otherwise indicated—*, pneumatic; D, dual; T, triple; †, steel; C, cushion.

Control or Driver's Position: C, center; L, left; O, optional; R, right.

Engine Starter: A, compressed air; E, electric; G, gas; S, spring.

Additional ABBREVIATIONS USED ON ELECTRICS

Motor Type: GE, general electric; SS, series-wound; SH, shunt.

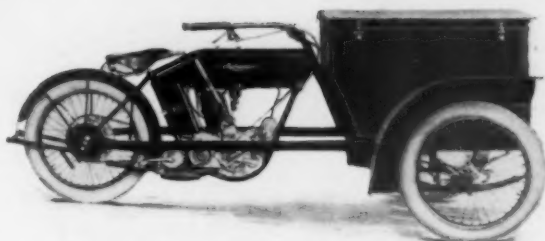
Battery Make: E, Edison; EX, Exide; G, Gould; P, Philadelphia; O, optional; ES, Electric Storage Battery Co.; U, U S L.

Battery Capacity: Given in Ampere hours.

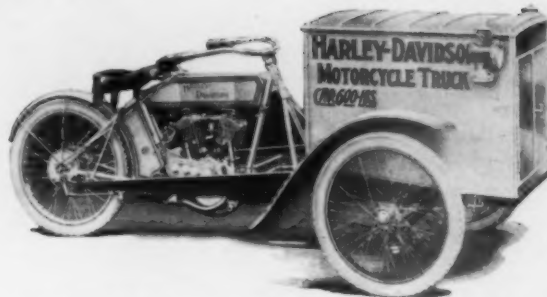
Controller: C, continuous torque; GE, General Electric; K, knife-blade.

Type Rear Axle: D, dead; E, floating; S, semi-floating; $\frac{3}{4}$, $\frac{3}{4}$ floating.

Indexes arranged alphabetically and according to price, will be found on pages 46 and 47



MICHAELSON 300-LB. BOX BODY TRICAR, \$375.
Made by Shapiro-Michaelson Motor Co.
Carrying space, 26x40x25. This chassis equipped with twin motor at \$425.



HARLEY-DAVIDSON 500-LB. BOX BODY TRICAR, \$425.

Commercial Cars

| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheel | Engine Starter |
|--|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|------------------------|----------------|
| Comet Cyclecar Co., Indianapolis, Ind. | | | | | | | | | | | |
| SL | A | M | V | L | 2 | *28x3 | *28x3 | C | 100 | 35 | .. |
| Imp Cyclecar Co., Auburn, Ind. | | | | | | | | | | | |
| O | A | 3/4 | .. | 4 | *28x2 1/2 | *28x2 1/2 | C | 100 | .. | .. | .. |
| Shapiro Michaelson Motor Car Co., Minneapolis, Minn. | | | | | | | | | | | |
| SL | .. | M | C | .. | .. | .. | .. | .. | 74 | .. | .. |
| SL | .. | M | C | .. | .. | .. | .. | .. | 74 | .. | .. |

Commercial Cars

| | | | | | | | | | | | |
|--|----|-----|----|----|---|-------|-------|----|----|----|----|
| Auburn Motor Chassis Co., Auburn, Ind. | | | | | | | | | | | |
| B | N | 1/2 | C | L | 2 | 1 1/4 | 1 1/4 | R | 70 | 67 | .. |
| Harley-Davidson Motor Co., Milwaukee, Wis. | | | | | | | | | | | |
| SL | B | S | C | S | 2 | *28x3 | *28x3 | .. | 76 | 50 | .. |
| Merz Cyclecar Co., Indianapolis, Ind. | | | | | | | | | | | |
| SL | A | M | .. | F | 4 | *28x3 | *28x3 | C | 84 | 67 | .. |
| Minneapolis Motor Co., Minneapolis, Minn. | | | | | | | | | | | |
| SL | .. | S | C | IC | 2 | *28x3 | *28x3 | .. | 74 | .. | .. |

Commercial Cars

| | | | | | | | | | | | |
|--|----|-----|----|---|----|-----------|------------|---|-----|----|----|
| Auburn Motor Chassis Co., Auburn, Ind. | | | | | | | | | | | |
| B | R | 1/2 | C | L | 2 | 1 1/4 | 1 1/4 | R | 77 | 67 | .. |
| Buckeye Mfg. Co., Anderson, Ind. | | | | | | | | | | | |
| SL | B | 1/2 | .. | F | .. | *30x3 1/2 | *31x4 | R | 106 | 75 | .. |
| Hupp Motor Car Co., Detroit, Mich. | | | | | | | | | | | |
| Z | B | S | B | S | 3 | *33x4 | *33x4 | R | 106 | 50 | .. |
| Wade Commercial Car Co., Holly, Mich. | | | | | | | | | | | |
| SL | WY | 1/2 | S | S | 2 | 36x2 | 36x2 | R | 84 | 60 | .. |
| Wagenhals Motor Co., Detroit, Mich. | | | | | | | | | | | |
| M | SD | .. | C | L | 2 | *30x3 | 34x4 1/2 C | C | 80 | 33 | .. |

Commercial Cars

| | | | | | | | | | | | |
|--|---|----|---|---|----|-----------|-----------|---|-----|----|----|
| Buick Motor Co., Flint, Mich. | | | | | | | | | | | |
| M | R | .. | W | S | 3 | *33x4 1/2 | *33x4 1/2 | L | 100 | .. | .. |
| Commerce Motor Car Co., Detroit, Mich. | | | | | | | | | | | |
| SL | B | S | C | F | .. | *32x3 1/2 | *32x3 1/2 | L | .. | 55 | .. |



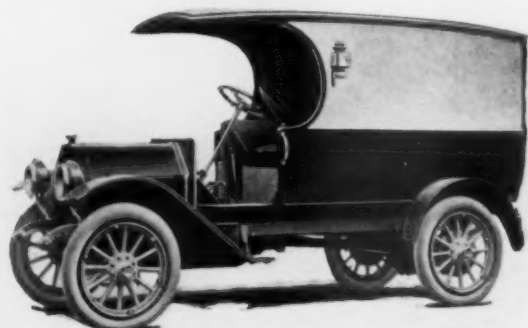
COMMERCE MODEL KH, 1000-LB. CANOPY TOP, \$975.



HUPMOBILE 750-LB. PANEL BODY, \$1075.
Made by Hupp Motor Car Co.



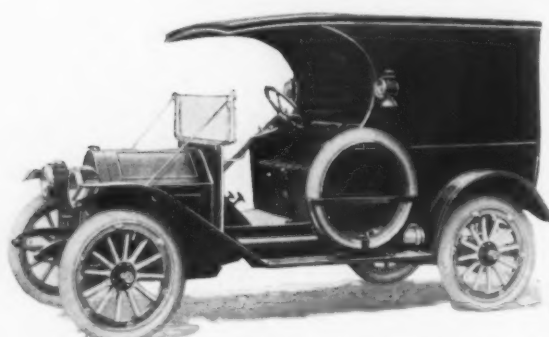
WADE 750-LB. OPEN EXPRESS, \$425.
This chassis also fitted with panel body, \$450; stake body, \$425.



BUICK MODEL 3, 1000-LB. PANEL BODY, \$1250.
This chassis also fitted with stake body, \$1150; open express, \$1100.



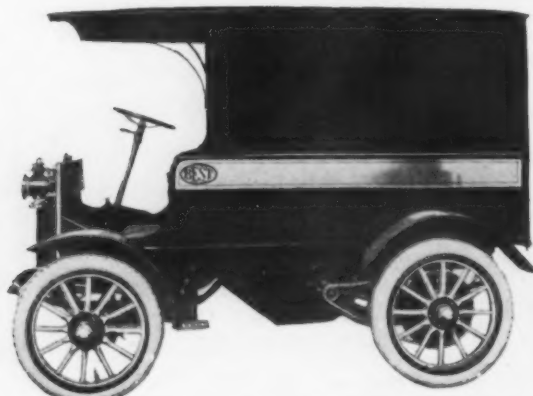
INTERNATIONAL MODEL MW, 1000-LB. SCREEN SIDE.
Made by International Harvester Co. of America.
Carrying space, 76x42.



KRIT MODEL KD, 1000-LB. PANEL BODY, \$900.



MOON MODEL A, 1000-LB. PANEL BODY, \$1600.
This chassis also fitted with stake body, \$1500; flare board, \$1500.



DURANT-DORT "BEST," 1000-LB. PANEL BODY, \$875.
This chassis also fitted with open express, \$800; covered express, \$840; screen panel, \$875.



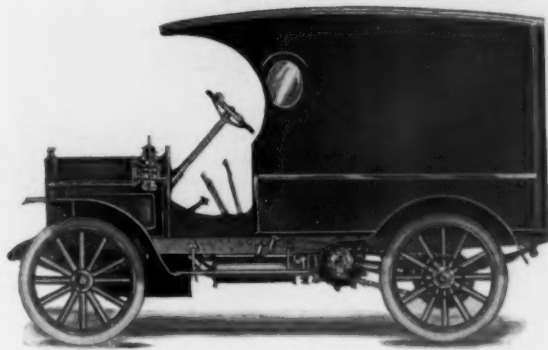
MILLER MODEL A, 1000-LB. PANEL BODY, \$850.
Carrying space, 66x44x55 in.
This chassis also fitted with stake body, 66x44 in., \$850; flare board, 66x44 in., \$850.

1000 Pound Gasoline

| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load Pftm | Maximum Speed | Horse Power | Cylinders | Bore | Stroke | Cylinders Cast | Cooling | Radiator |
|---|----------------|---------------|------------------------------|------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|
| Dart Mfg. Co., Waterloo, Iowa. | | | | | | | | | | | | |
| A | 1200 | 800 | 34 25 21 4 | 3.63 | 4 | | | | | | B T H | |
| Durant-Dort Carriage Co., Flint, Mich. | | | | | | | | | | | | |
| Best | 1900 | 750 | 31 18 16 2 | 4.5 | 4.5 | | | | | | S T V | |
| F. S. Motors Co., Milwaukee, Wis. | | | | | | | | | | | | |
| 25 | 600 | 30 | 23 4 | 3.75 | 4.5 | | | | | | P T T | |
| International Harvester Corp., Chicago, Ill. | | | | | | | | | | | | |
| MW | 2135 | 38 | 18 16 2 | 4.5 | 5 | | | | | | S C V | |
| MA | 2050 | 38 | 15 20 2 | 5 | 5 | | | | | | S A | |
| Clebume Motor Car Mfg. Co., Cleburne, Tex. | | | | | | | | | | | | |
| .... | 42x90 | 20 | 4 3.5 | 4.25 | | | | | | | W T | |
| Krit Motor Car Co., Detroit, Mich. | | | | | | | | | | | | |
| K-D | *900 | 51x45x52 | 31 23 4 | 3.75 | 4 | | | | | | T | |
| Mercury Mfg. Co., Chicago, Ill. | | | | | | | | | | | | |
| P | 1500 | 750 | 34 15 14 2 | 4.25 | 4 | | | | | | S A | |
| W. H. McIntyre Co., Auburn, Ind. | | | | | | | | | | | | |
| III | 1800 | 800 | 34 20 18 4 | 3.38 | 3.75 | | | | | | B T T | |
| Miller Car Co., Detroit, Mich. | | | | | | | | | | | | |
| A | 1800 | 800 | 66x44x55 | 32 | 30 | 20 | 4 | 3.5 | 4 | | B C T | |
| Joseph W. Moon Buggy Co., St. Louis, Mo. | | | | | | | | | | | | |
| A | 1350 | 25 | 20 4 | 3.5 | 5 | | | | | | B C H | |
| O. K. Motor Truck Co., Detroit, Mich. | | | | | | | | | | | | |
| C | 2000 | 850 | 24 24 20 4 | 3.5 | 5 | | | | | | B T T | |
| Perfex Co., Los Angeles, Cal. | | | | | | | | | | | | |
| 7 | 1700 | 900 | 35 18 4 | 3.38 | 4 | | | | | | P C H | |
| Pratt-Carter-Sigbee & Co., Detroit, Mich. | | | | | | | | | | | | |
| C | *925 | 38x60 | 32 16 2 | 4.5 | 4.5 | | | | | | T | |
| Wasatch Motor Mfg. Co., Salt Lake City, Utah. | | | | | | | | | | | | |
| A | 2600 | 1500 | 29 25 20 4 | 3.5 | 5 | | | | | | B T H | |
| Crow Motor Car Co., Elkhart, Ind. | | | | | | | | | | | | |
| .... | 1900 | 925 | 48x36x56 | 45 | 26 | 4 | 4.5 | | | | P T | |
| Mason Motor Co., Waterloo, Iowa. | | | | | | | | | | | | |
| 12 | 1500 | 800 | 40x66 | 35 | 20 | 2 | 5 | | | | S W V | |



MERCURY MODEL P-2, 1000-LB. PANEL BODY, \$870.



McINTYRE MODEL III, 1000-LB. PANEL BODY, CHASSIS, \$800.

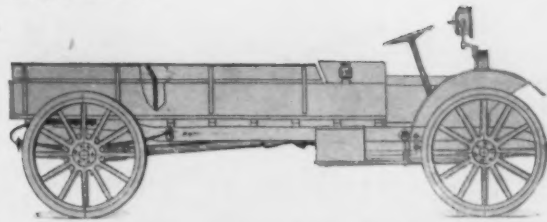
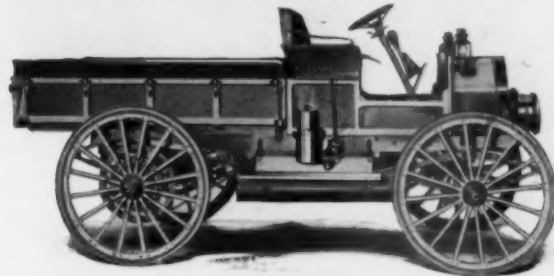
Commercial Cars

| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|------------|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
| SB | BR | M | B | S | 3 | *32x3 | *32x3 1/2 | L | 105 | 65 | .. |
| M | R | 1/2 | .. | F | .. | 32x2 | 34x2 1/2 | L | 78 | 60 | .. |
| SB | BR | 1/2 | .. | F | 4 | *32x3 | *32x3 1/2 | R | 98 | .. | .. |
| SL | H | 2 | C | .. | .. | .. | .. | R | 90 | .. | .. |
| SL | H | 2 | C | .. | .. | .. | .. | R | 90 | .. | .. |
| .. | R | .. | S | S | 3 | 2 1/2 | 3 | R | 115 | .. | .. |
| SB | B | 1/2 | B | S | .. | *32x3 1/2 | *32x3 1/2 | L | 108 | .. | .. |
| SP | R | 1/2 | C | L | S | .. | .. | R | 85 | 50 | .. |
| K | B | M | C | S | 3 | 34x2 1/2 | 34x2 1/2 | L | 104 | 70 | .. |
| Z | B | 1/2 | B | S | 3 | *32x3 1/2 | *32x3 1/2 | L | 111 | 60 | .. |
| SB | R | .. | B | S | 3 | 32x2 1/2 | 32x3 | L | 122 | .. | G |
| SB | B | S | B | S | 3 | *32x4 | *32x4 | L | 116 | 68 | E |
| SB | SD | S | B | S | 3 | 31x3 1/2 | 31x3 1/2 | L | 116 | 75 | .. |
| SL | B | 1/2 | C | P | .. | 36x2 1/2 | 36x2 1/2 | L | 96 | .. | .. |
| SB | B | S | C | S | 3 | 36x2 | 36x2 | L | 100 | 60 | E |
| SL | BR | 1/2 | B | S | 3 | 33x4 | 33x4 | R | 114 | 50 | .. |
| SL | SD | 1/2 | C | L | 2 | *32x3 1/2 | *32x3 1/2 | R | 96 | 60 | .. |



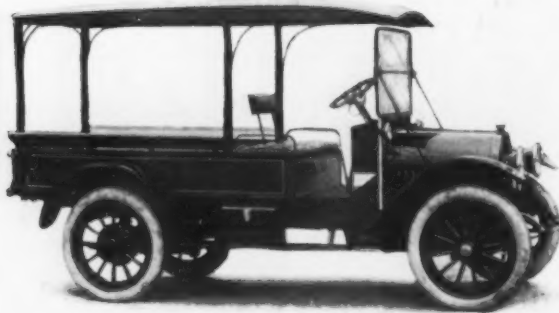
MERCURY MODEL P-4, 1000-LB. FORE DOOR PANEL BODY, \$900.

This chassis also fitted with stake body, \$765.

LUCK-TRUCK, 1000-LB. FLARE BOARD BODY.
Made by Cleburne Motor Car Mfg. Co.INTERNATIONAL MODEL MA, 1000-LB. FLARE BOARD.
Made by International Harvester Co. of America.
Carrying space, 72 in. long.
This chassis also fitted with stake body, 76x42.PERFEX TYPE 7, 1000-LB. PANEL BODY, \$975.
This chassis also fitted with stake body, \$935; flare board, \$930.

MERCURY MODEL P-1, 1000-LB. FLARE BOARD, \$750.

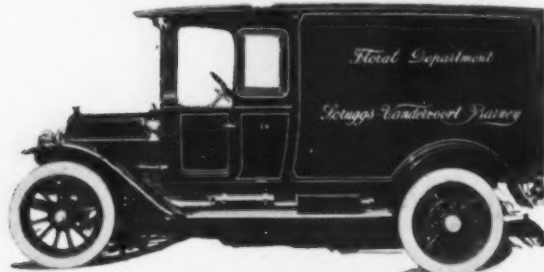
O. K. MODEL D, 1000-LB. PANEL BODY, \$900.
Chassis same as Model C, also fitted with stake body, \$900; flare board, \$925.



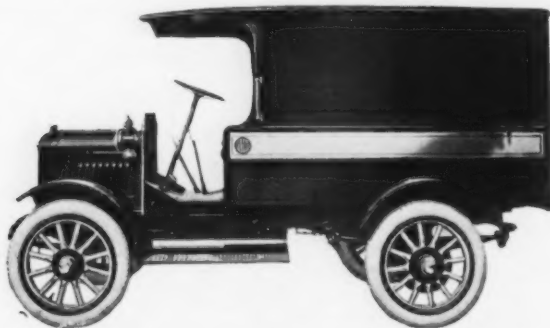
STUDEBAKER 1500-LB. CANOPY TOP, \$1150.
Carrying space, 73x43 in.



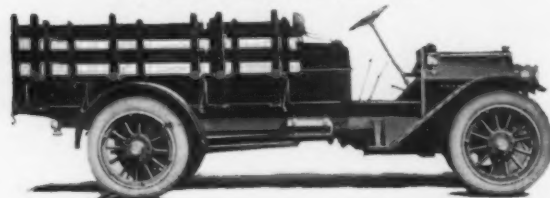
STUDEBAKER 1500-LB. PANEL BODY, \$1150.
Carrying space, 71x42 in.



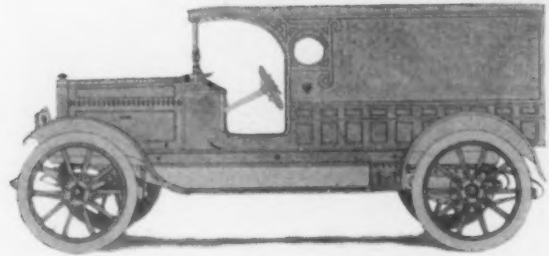
MORRIS 1500-LB. PANEL BODY, CHASSIS, \$1950 AND \$2100.



DURANT-DORT "FLINT," 1500-LB. PANEL BODY, \$1460.
This chassis also fitted with open express body, \$1365; covered express, \$1435; screen side, \$1460.



BUICK MODEL 4, 1500-LB. STAKE BODY, \$1300.



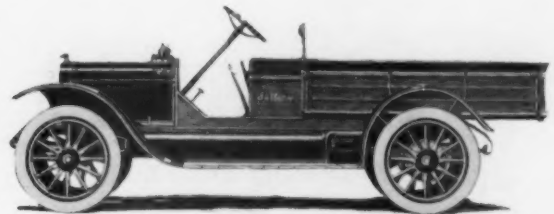
DISPATCH MODEL L, 1250-LB. PANEL BODY, \$900.
Carrying space, 40x66x72 in.

1250 Pound Gasoline

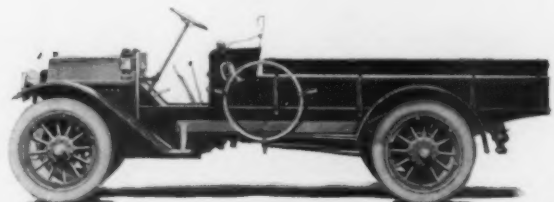
| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P't'n | Maximum Speed | Mileage per Charge | Motor | Battery |
|--|----------------|---------------|------------------------------|-------------------|---------------|--------------------|-------|---------|
| Auburn Motor Chassis Co., Auburn, Ind. | | | | | | | | |
| Sr. | ..... | ..... | 16 18 2 | 4.75 | 4.75 | S | A | .. |
| Buckeye Mfg. Co., Anderson, Ind. | | | | | | | | |
| V-2 | 2650 | 1125 | 36 20 23 4 | 3.75 | 4.25 | P | C | T |
| Dispatch Motor Car Co., Minneapolis, Minn. | | | | | | | | |
| Express | 1800 | 825 | 40x66x72 | 30 35 23 4 | 3.75 | 5 | B | T H |
| Kosmath Company, Detroit, Mich. | | | | | | | | |
| 1914 | 1850 | 900 | 67x44x54 | 28 25 20 4 | 3.5 | 4 | P | C V |

1500 Pound Gasoline

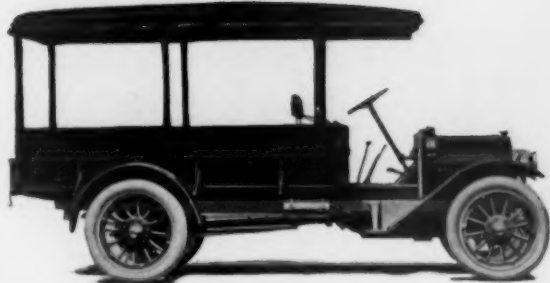
| | | | | | | | | |
|---|------|----------|------------|------------|---------|------|-----|-------|
| Avery Co., Peoria, Ill. | | | | | | | | |
| ..... | 3500 | 2000 | 36 4 | 4.75 | 5 | S | G | H |
| Buick Motor Co., Flint, Mich. | | | | | | | | |
| 4 | 2420 | 1125 | 31 25 14 4 | 3 | 5 | B | T | T |
| Crown Commercial Car Co., Milwaukee, Wis. | | | | | | | | |
| A | 2000 | 1650 | 30 25 23 4 | 3.75 | 5 | B | T | V |
| Durant-Dort Carriage Co., Flint, Mich. | | | | | | | | |
| Flint | 2900 | 1285 | 33 18 23 4 | 3.75 | 4.5 | B | T | V |
| Fargo Motor Car Co., Chicago, Ill. | | | | | | | | |
| E | 2100 | 775 | 44x78 | 36 15 16 2 | 4.5 | 6 | S | T H |
| E | 2100 | 775 | 44x78 | 36 15 16 2 | 4.5 | 6 | S | T H |
| Thomas B. Jeffery Co., Kenosha, Wis. | | | | | | | | |
| ..... | 1250 | 48x84x64 | 33 | 32 4 | 4.5 | 4.5 | S | C T |
| Kissel Motor Car Co., Hartford, Wis. | | | | | | | | |
| ..... | 2700 | ..... | 35 | 29 4 | 4.25 | 6.25 | P | C T |
| Wm. Landshaft & Sons, Chicago, Ill. | | | | | | | | |
| C | 2400 | 1000 | 42x80 | 36 15 14 4 | 3 | 4.5 | B | T H |
| W. H. McIntyre Co., Auburn, Ind. | | | | | | | | |
| E | 2600 | 1500 | 34 | 26 4 | 4 | 4.5 | B | T T |
| D. F. Poyer, Menominee, Mich. | | | | | | | | |
| A3 | 2350 | 1125 | 60x84 | 32 | 20 23 4 | 3.75 | 4.5 | P C V |
| Rockford Motor Truck Co., Rockford, Ill. | | | | | | | | |
| ..... | 1500 | ..... | 20 23 4 | 3.75 | 5.25 | B | C H | |
| Studebaker Corp., Detroit, Mich. | | | | | | | | |
| ..... | 1050 | ..... | 30 20 20 4 | 3.5 | 5 | B | G T | |



JEFFERY 1500-LB. FLARE BOARD, \$1325.
Carrying space, 48x84 in. This chassis also fitted with panel body, 48x84x64, \$1500; stake body, 48x90, \$1365; canopy top, 48x84, \$1375.



BUICK MODEL 4, 1500-LB. FLARE BOARD, \$1250.



BUICK MODEL 4, 1500-LB. COVERED FLARE BOARD, \$1325.



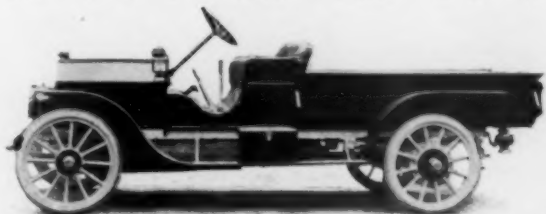
KISSEL KAR, 1500-LB. PANEL BODY, CHASSIS, \$1500.

Commercial Cars

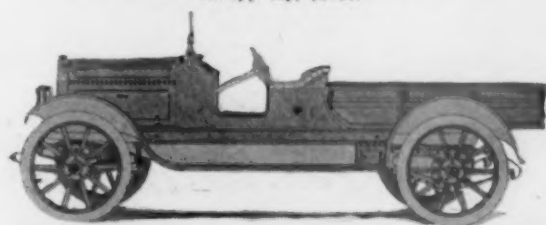
| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|--|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
| B | R | 1/2 | C | L | 2 | 1 1/2 | 1 1/2 | R | 86 | 67 | .. |
| Auburn Motor Chassis Co., Auburn, Ind. | | | | | | | | | | | |
| SL | B | 1/2 | F | .. | .. | 33x4 | 33x4 1/2 | R | 114 | 75 | .. |
| Buckeye Mfg. Co., Anderson, Ind. | | | | | | | | | | | |
| Z | SD | 1/2 | C | F | 5 | 36x3 1/2 | 36x3 1/2 | R | 120 | 44 | .. |
| Dispatch Motor Car Co., Minneapolis, Minn. | | | | | | | | | | | |
| O | SW | S | B | S | 3 | 32x3 1/2 | 32x3 1/2 | L | 110 | 65 | .. |
| Kosmath Company, Detroit, Mich. | | | | | | | | | | | |

Commercial Cars

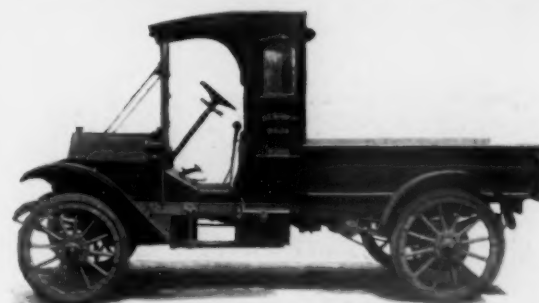
| | | | | | | | | | | | |
|---|----|-----|----|---|---|----------|----------|---|-----|----|----|
| SL | E | .. | S | S | 3 | 36x4 1/2 | 36x4 1/2 | R | 120 | .. | .. |
| Avery Co., Peoria, Ill. | | | | | | | | | | | |
| M | R | .. | W | S | 3 | 33x5 | 33x5 | L | 122 | .. | .. |
| Buck Motor Co., Flint, Mich. | | | | | | | | | | | |
| .. | B | S | W | S | 4 | 34x4 1/2 | 34x4 1/2 | L | 130 | 75 | .. |
| Crown Commercial Car Co., Milwaukee, Wis. | | | | | | | | | | | |
| M | R | S | B | S | 3 | 34x2 1/2 | 34x3 1/2 | L | 106 | 75 | .. |
| Durant-Dort Carriage Co., Flint, Mich. | | | | | | | | | | | |
| H | B | 1/2 | .. | F | 6 | 35x3 | 35x3 | L | 86 | 65 | .. |
| Fargo Motor Car Co., Chicago, Ill. | | | | | | | | | | | |
| H | B | 1/2 | .. | F | 6 | 35x3 | 35x3 | L | 104 | 65 | .. |
| Thomas B. Jeffery Co., Kenosha, Wis. | | | | | | | | | | | |
| H | R | S | B | S | 3 | 34x4 1/2 | 34x4 1/2 | R | 120 | 65 | .. |
| Kissel Motor Car Co., Hartford, Wis. | | | | | | | | | | | |
| SB | B | S | S | S | 3 | .. | .. | L | 125 | 70 | .. |
| Wm. Landshaft & Sons, Chicago, Ill. | | | | | | | | | | | |
| SL | R | S | C | L | 2 | 34x2 1/2 | 36x2 1/2 | R | 117 | 70 | .. |
| W. H. McIntyre Co., Auburn, Ind. | | | | | | | | | | | |
| SB | BR | 1/2 | C | S | 3 | 34x3 | 34x3 1/2 | R | 118 | 70 | .. |
| D. F. Poyer, Menominee, Mich. | | | | | | | | | | | |
| SL | R | .. | B | S | 3 | 32x3 1/2 | 32x3 1/2 | R | 122 | 60 | .. |
| Rockford Motor Truck Co., Rockford, Ill. | | | | | | | | | | | |
| SB | P | S | C | S | 3 | .. | .. | L | 125 | 70 | .. |
| Studebaker Corp., Detroit, Mich. | | | | | | | | | | | |
| SL | R | 1/2 | S | S | 3 | 34x4 1/2 | 34x4 1/2 | L | 106 | .. | E |



MENOMINEE MODEL A-3, 1500-LB. FLARE BOARD, \$1200.
Made by D. F. Poyer Co.
Carrying space, 78x42 in. This chassis also fitted with detachable panel body, \$1300; stake body, 84x60 in., \$1200; canopy top, \$1200.



DISPATCH MODEL K, 1250-LB. FLARE BOARD, \$850.
Carrying space, 40x72 in.



LANDSHAFT MODEL C, 1500-LB. FLARE BOARD, \$1075.
Carrying space, 86x44 in. This chassis also fitted with panel body, 80x42, \$1150; stake body, 86x44, \$1075.



FARGO MODEL E, 1500-LB. FLARE BOARD, \$850.
Carrying space, 96x45 in. This chassis also fitted with stake body, 78x44 in., \$850; furniture van, 96x45 in., \$850; plumbers' body, 96x45 in., \$850.



FARGO MODEL E, 1500-LB. PANEL BODY, \$950.
Carrying space, 78x44 in.



SIGNAL MODEL D, 1500-LB. CHASSIS, \$1350.

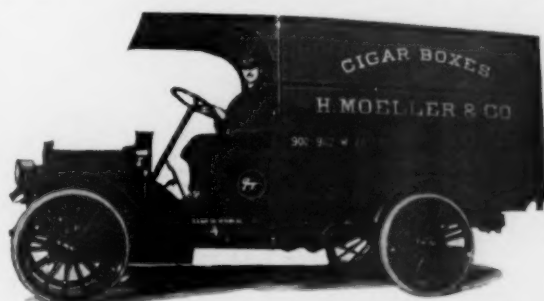
Commercial Cars

| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|------------|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
|------------|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|

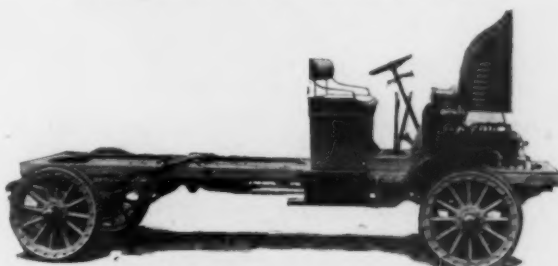
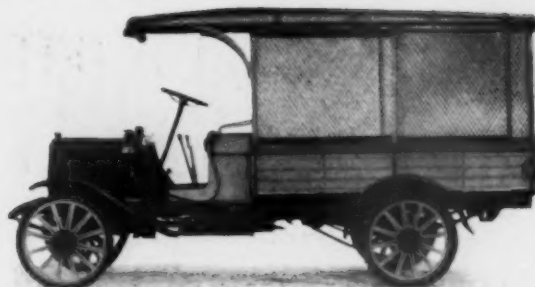
| | | | | | | | | | | | |
|---|----|-----|---|---|---|-----------|-----------|---|-----|----|----|
| SB | E | S | C | S | 3 | 34x3 | 34x3 1/2 | L | 115 | 62 | .. |
| Signal Motor Truck Co., Detroit, Mich. | | | | | | | | | | | |
| C | E | .. | B | S | 3 | *34x4 1/2 | *34x4 1/2 | L | 125 | 85 | .. |
| Stegeman Motor Car Co., Milwaukee, Wis. | | | | | | | | | | | |
| K | MI | .. | B | S | 3 | *33x4 | *33x4 | R | 112 | .. | .. |
| Wayne Works, Richmond, Ind. | | | | | | | | | | | |
| SB | BR | S | C | S | 3 | *34x4 | *34x5 | L | 130 | .. | .. |
| South Bend Motor Car Wks., South Bend, Ind. | | | | | | | | | | | |
| SL | SD | 1/2 | C | L | 2 | *32x3 1/2 | *32x3 1/2 | R | 96 | 60 | .. |
| Mason Motor Co., Waterloo, Iowa. | | | | | | | | | | | |
| F | B | S | B | S | 3 | *36x4 1/2 | *36x4 1/2 | L | 121 | .. | .. |
| Dorris Motor Co., St. Louis, Mo. | | | | | | | | | | | |
| .. | A | .. | C | L | 2 | 2 1/2 | 2 1/2 | L | 86 | .. | .. |
| Veerac Motor Co., Anoka, Minn. | | | | | | | | | | | |

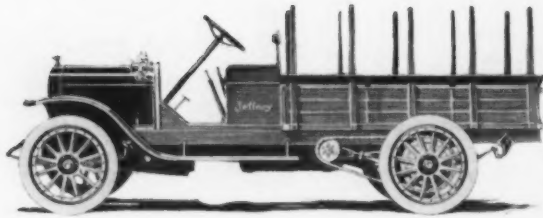
Commercial Cars

| | | | | | | | | | | | |
|---|----|----|----|---|----|----------|----------|---|-----|----|----|
| R | H | .. | C | S | 3 | 34x3 1/2 | 34x5 | L | 128 | .. | .. |
| Avery Co., Peoria, Ill. | | | | | | | | | | | |
| SL | BR | S | C | S | 3 | 36x3 | 36x3 1/2 | L | 120 | .. | .. |
| Available Truck Co., Chicago, Ill. | | | | | | | | | | | |
| SL | BR | S | .. | F | .. | 36x3 | 36x3 1/2 | R | 120 | 75 | .. |
| Buckeye Mfg. Co., Anderson, Ind. | | | | | | | | | | | |
| H | K | S | C | S | 3 | 3 1/2 | 3 1/2 | L | 110 | 67 | .. |
| Chicago Pneumatic Tool Co., Chicago, Ill. | | | | | | | | | | | |
| SB | B | S | W | S | 4 | 34x3 1/2 | 38x5 | L | 135 | 75 | .. |
| Crown Commercial Car Co., Milwaukee, Wis. | | | | | | | | | | | |
| SB | E | M | B | S | 3 | 36x3 | 36x3 1/2 | L | 114 | 65 | .. |
| Dart Mfg. Co., Waterloo, Iowa. | | | | | | | | | | | |
| SB | O | S | C | S | 3 | 34x3 1/2 | 34x4 | L | 145 | 60 | .. |
| Detroit Wyandotte Motor Co., Wyandotte, Mich. | | | | | | | | | | | |
| SB | E | S | C | S | 3 | 35x3 | 35x3 | L | 115 | 80 | .. |
| S. G. Gay Co., Ottawa, Ill. | | | | | | | | | | | |



GAY MODEL F, 2000-LB. PANEL BODY, \$1675.

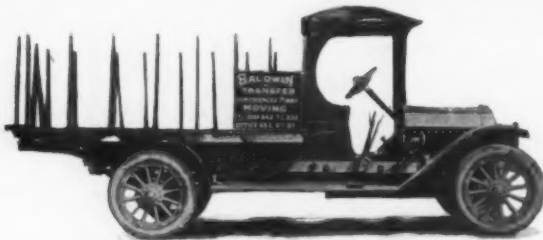
HORNER 2000-LB CHASSIS, \$2000.
Made by Detroit-Wyandotte Motor Co.SIGNAL MODEL D, 1500-LB. SCREEN SIDE BODY, \$1525.
Carrying space, 96x46 in.SIGNAL MODEL D, 1500-LB. PANEL BODY, \$1575.
Carrying space, 96x46 in. This chassis also fitted with stake body, 96x46 in., \$1475; flare board, 96x46 in., \$1475; canopy top, \$1500.LITTLE GIANT MODEL H, 2000-LB. FLARE BOARD, \$1425.
Made by Chicago Pneumatic Tool Co.
Carrying space, 114x44 in. This chassis also fitted with panel body, \$1525; stake body, \$1450; canvas top, \$1475, same carrying space.AVAILABLE MODEL 25, 2000-LB. COVERED FLARE BOARD, \$1400.
This chassis also fitted with panel body, \$1500; stake body, \$1425.



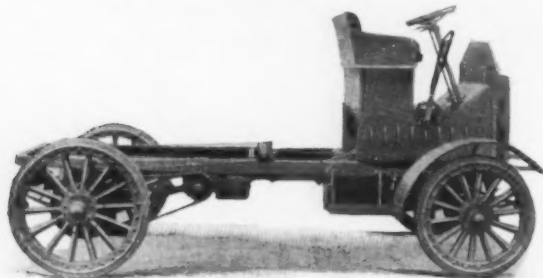
JEFFERY 2000-LB. FLARE BOARD WITH STAKES, \$1575.
Carrying space, 48x100 in. This chassis also fitted with panel body, 48x100x64, \$1750; stake body, 66x112 in., \$1650; canopy top, 48x100, \$1625.



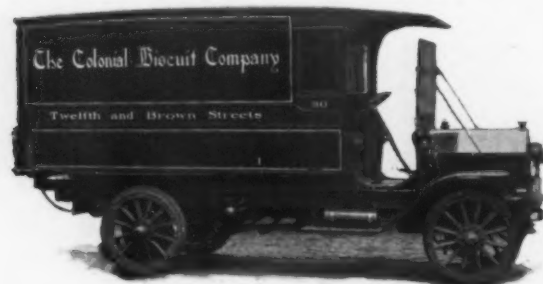
NELSON & LE MOON MODEL D-1, 2000-LB. COVERED FLARE BOARD, CHASSIS, \$1800.



KISSEL KAR 2000-LB. STAKE BODY, CHASSIS, \$1850.



MONITOR MODEL E, 2000-LB. CHASSIS, \$1750.
This chassis fitted with open express or stake body, \$1800.



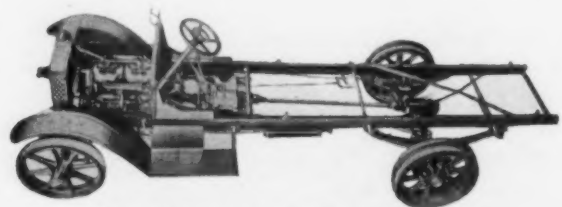
WILCOX MODEL L, 2000-LB. PANEL BODY, \$2300.



NATCO TYPE 15, 2000-LB. COVERED FLARE BOARD, CHASSIS, \$1925.
Made by National Motor Truck Co.

2000 Pound Gasoline

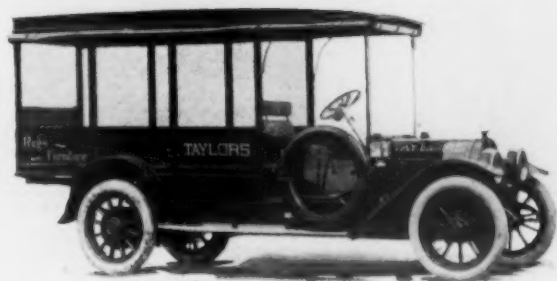
| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load Pftm | Maximum Speed | Horse Power | Cylinders | Bore | Stroke | Cylinders Cast | Cooling | Radiator |
|-------|----------------|---------------|------------------------------|------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|
| 60 | 1000 | 1000 | 30 31 4 | 4.38 | 4.75 | P | G | T | | | | |
| .... | 1500 | 1500 | 48x100x64 | 33 18 32 4 | 4.5 | 4.5 | S | C | T | | | |
| .... | 3400 | 3400 | 35 20 32 4 | 4.5 | 5.25 | P | C | T | | | | |
| .... | 3000 | 2500 | 42 20 26 4 | 4 | 5 | P | C | H | | | | |
| B | 3800 | 1450 | 26 16 23 4 | 3.75 | 5.25 | B | C | T | | | | |
| 15 | 2800 | 1925 | 31 20 20 4 | 3.5 | 5 | B | T | V | | | | |
| D1 | 3400 | 1800 | 34 15 23 4 | 3.75 | 5.25 | B | C | V | | | | |
| .... | 2950 | 1600 | 40 18 23 4 | 3.75 | 5 | B | C | H | | | | |
| B-3 | 3050 | 1400 | 60x102 | 38 18 26 4 | 4 | 5 | P | T | V | | | |
| .... | 3200 | 1350 | 46x96 | 38 20 23 4 | 3.75 | 5.25 | B | C | T | | | |
| .... | 3400 | 2250 | 18 23 4 | 3.75 | 5.25 | B | C | T | | | | |
| X | 3500 | 2000 | 48x108 | 36 18 33 4 | 4.63 | 5.25 | P | C | V | | | |
| C | 3700 | 2000 | 29 20 23 4 | 3.75 | 5.25 | B | C | H | | | | |
| L | 3200 | 2000 | 31 16 29 4 | 4.25 | 4.5 | P | W | V | | | | |
| B | 3150 | 1500 | 93 | 41 15 23 4 | 3.75 | 5.25 | B | C | H | | | |



CROWN MODEL A, 1500-LB. CHASSIS, \$1650.



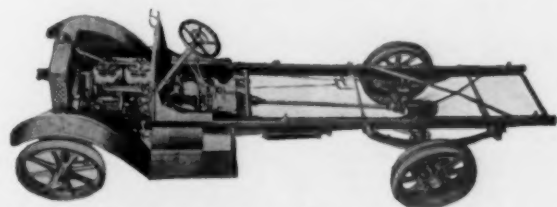
O. K. MODEL B, 2000-LB. SIDED STAKE BODY, \$1600.
This chassis also fitted with panel body, \$1650; stake body, \$1575; flare board, \$1600.



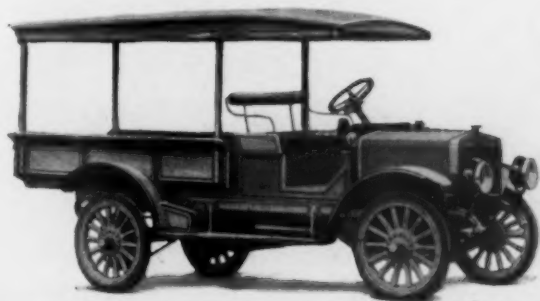
MARMON 2000-LB. COVERED FLARE BOARD, CHASSIS, \$2500.
Made by Nordyke & Marmon Co.

Commercial Cars

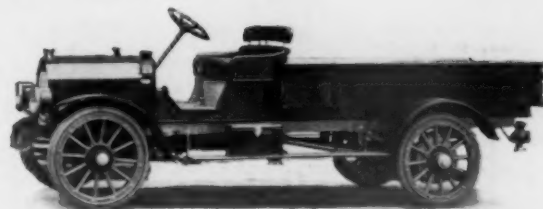
| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|------------|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
| SB | R | 1/2 | F | 4 | *34x4 | *34x5 | R | 116 | .. | .. | .. |
| H | R | S | C | S | 3 | 34x4 | 34x4 1/2 | R | 120 | 65 | .. |
| SB | B | S | S | S | 3 | .. | .. | R | 140 | 70 | .. |
| SB | B | S | B | S | 3 | *34x4 | *35x5 | R | 120 | 80 | G |
| SB | B | S | C | S | 3 | 36x3 | 38x4 | L | 130 | 65 | E |
| Z | UH | S | C | S | 3 | 36x3 1/2 | 36x3 1/2 | L | 105 | 60 | .. |
| R | B | M | C | S | 3 | .. | .. | R | .. | 80 | .. |
| SB | B | 1/2 | C | S | 3 | 34x3 1/2 | 34x4 | R | 118 | 65 | .. |
| SB | B | .. | B | S | 3 | 34x3 1/2 | 34x3 1/2 | R | 122 | 60 | .. |
| SL | E | 1/2 | C | S | 3 | 36x3 | 35x4 | L | 124 | 70 | .. |
| C | E | .. | C | S | 3 | 34x3 1/2 | 36x4 | L | 150 | 85 | .. |
| SB | B | S | B | S | 3 | 36x3 1/2 | 36x4 | L | 129 | 80 | E |
| SB | B | S | C | S | 3 | 36x4 | 36x5 | L | 130 | 65 | E |
| O | O | 1/2 | C | S | 3 | 3 1/2 | 4 | C | 124 | 70 | .. |
| O | O | .. | C | S | 3 | 34x3 | 34x3 1/2 | L | 120 | 67 | .. |



CROWN MODEL B, 3000-LB. CHASSIS, \$2300.



SERVICE MODEL K, 2000-LB. CANOPY TOP, CHASSIS, \$1475.



MENOMINEE MODEL B-3, 2000-LB. FLARE BOARD, \$1500.
Made by D. F. Foyer Co.
Carrying space, 102x46. This chassis also fitted with detachable panel body, \$1525; stake body, 102x60 in., \$1500; canopy top, \$1525.



VELIE MODEL X, 2000-LB. OPEN EXPRESS, \$2150.
Carrying space, 108x48 in. This chassis also fitted with stake body, 108x48 in., \$2150.



STEGEMAN 2000-LB. CANOPY TOP, CHASSIS, \$2250.



MARMON 2000-LB. PANEL BODY, CHASSIS, \$2500.
Made by Nordyke & Marmon Co.



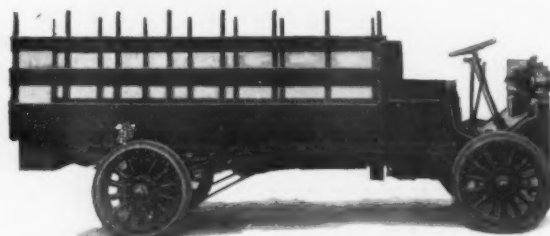
PALMER-MEYER 2000-LB. CANOPY TOP, CHASSIS, \$1600.



IDEAL MODEL I, 2000-LB. COVERED FLARE BOARD, CHASSIS, \$1500.



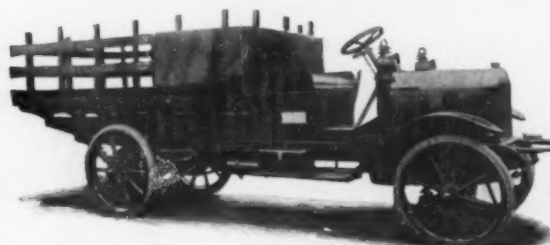
FOUR-WHEEL DRIVE MODEL G, 3000-LB. STAKE BODY, CHASSIS, \$3600.



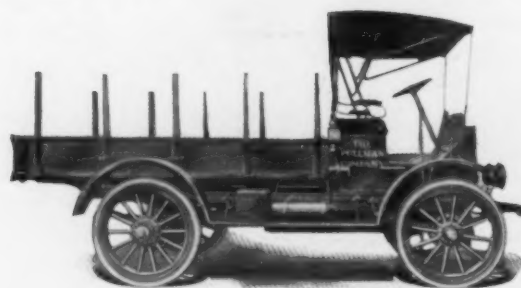
DANIELSON MODEL A, 3000-LB. STAKE, CHASSIS, \$2000.



GAY MODEL G, 3000-LB. OPEN EXPRESS, \$1775.
This chassis also fitted with panel body, \$1875; stake body, \$1775.



HARVEY MODEL F, 3000-LB. STAKE BODY, \$2000.
This chassis also fitted with panel and flare board bodies, same price.



CLARK 2000-LB. STAKE SIDE, CHASSIS, \$2000.

2000 Pound Gasoline

| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P't'm | Maximum Speed | Horse Power | Cylinders | Bore | Stroke | Cylinders Cast | Cooling | Radiator |
|-------|----------------|---------------|------------------------------|-------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|
| A | 3025 | 1650 | ..... | 30 | .. | 17 | 4 | 3.25 | 5 | | B | T |
| I | 2700 | 1500 | 44x102 | 39 | 25 | 23 | 4 | 3.75 | 4.5 | | B | T |
| .... | 2000 | ..... | ..... | 18 | 23 | 4 | 3.75 | 5 | | B | T | |
| D | 2000 | ..... | ..... | 18 | 23 | 4 | 3.75 | 5 | | B | T | |
| E | 2000 | ..... | ..... | 18 | 23 | 4 | 3.75 | 5 | | B | T | |

2500 Pound Gasoline

| | | | | | | | | | |
|----|------|----|----|---|-----|------|---|---|----|
| VC | 1500 | 14 | 20 | 4 | 3.5 | 5.25 | B | W | .. |
|----|------|----|----|---|-----|------|---|---|----|

3000 Pound Gasoline

| | | | | | | | | | | | | |
|-----------|------|------|---|----|----|----|------|------|------|---|---|---|
| | | | Buckeye Mfg. Co., Anderson, Ind. | | | | | | | | | |
| V-4 | 5000 | 1900 | .. | .. | 27 | 4 | 4.13 | 5.25 | B | C | V | |
| | | | Crown Commercial Car Co., Milwaukee, Wis. | | | | | | | | | |
| B | 3900 | 2300 | 31 | 17 | 29 | 4 | 4.25 | 5 | P | C | V | |
| | | | Danielson Engine Works, Chicago, Ill. | | | | | | | | | |
| A | 3600 | 2000 | 36 | 20 | 29 | 4 | 4.25 | 4.25 | S | C | V | |
| | | | Detroit Wyandotte Motor Co., Wyandotte, Mich. | | | | | | | | | |
| 1½ | 4320 | 2250 | 40 | 15 | 27 | 4 | 4.13 | 5.25 | B | C | T | |
| | | | Diamond T. Motor Car Co., Chicago, Ill. | | | | | | | | | |
| J | 3600 | 2250 | .. | .. | 15 | 27 | 4 | 4.13 | 5.25 | B | C | T |
| J | 3600 | 2250 | .. | .. | 15 | 27 | 4 | 4.13 | 5.25 | B | C | T |
| | | | S. G. Gay Co., Ottawa, Ill. | | | | | | | | | |
| G | 2700 | 1675 | 35 | 15 | 26 | 4 | 4 | 4.5 | P | C | V | |
| | | | Harvey Motor Truck Works, Harvey, Ill. | | | | | | | | | |
| F | 3600 | 1875 | 29 | 16 | 23 | 4 | 3.75 | 5.5 | B | C | H | |
| | | | Four Wheel Drive Auto Co., Clintonville, Wis. | | | | | | | | | |
| G | 4000 | 3600 | 43 | 10 | 29 | 4 | 4.25 | 5 | P | C | H | |
| | | | Federal Motor Truck Co., Detroit, Mich. | | | | | | | | | |
| | 3000 | 1820 | 60x126 | .. | .. | 27 | 4 | 4.13 | 5.25 | B | W | V |
| | 3000 | 1820 | 60x126 | .. | .. | 27 | 4 | 4.13 | 5.25 | B | W | V |
| | | | Fargo Motor Car Co., Chicago, Ill. | | | | | | | | | |
| G | 3900 | 1600 | 48x108 | 38 | 15 | 23 | 4 | 3.75 | 5 | P | T | H |
| | | | Thomas B. Jeffery Co., Kenosha, Wis. | | | | | | | | | |
| Quad. Dr. | 3000 | 3000 | 41 | 14 | 23 | 4 | 3.75 | 5.25 | B | C | T | |
| | | | Kissel Motor Car Co., Hartford, Wis. | | | | | | | | | |
| | 4400 | 4400 | 46 | 16 | 29 | 4 | 4.25 | 5.25 | P | C | T | |
| | | | Kalamazoo Motor Vehicle Co., Kalamazoo, Mich. | | | | | | | | | |
| B | 2800 | 1590 | 31 | 18 | 23 | 4 | 3.75 | 5.25 | B | C | T | |



CONTINENTAL, 3000-LB. CHASSIS, \$1850.



WICHITA FALLS MODEL A, 2000-LB. ENCLOSED BODY, CHASSIS, \$1650.

Commercial Cars

| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|--|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
| C | B | .. | C | S | 3 | 31x3 | 34x4 | R 110 | 75 | .. | .. |
| Wichita Falls Motor Co., Wichita Falls, Tex. | | | | | | | | | | | |
| SL | E | S | C | S | 3 | 36x3 | 36x3 1/2 | R 115 | 64 | .. | .. |
| Ideal Auto Co., Fort Wayne, Ind. | | | | | | | | | | | |
| .. | E | .. | B | H | 3 | 3 | 3 1/2 | .. | 100 | .. | .. |
| .. | E | .. | B | H | 3 | 3 | 3 1/2 | .. | 120 | .. | .. |
| .. | E | .. | B | H | 3 | 3 | 3 1/2 | .. | 120 | .. | .. |
| Clark Delivery Car Co., Chicago, Ill. | | | | | | | | | | | |

Commercial Cars

| | | | | | | | | | | | |
|--|---|----|---|---|---|------|------|-------|----|----|----|
| K | B | .. | C | S | 3 | 24x3 | 36x5 | L 148 | .. | .. | .. |
| General Motors Truck Co., Pontiac, Mich. | | | | | | | | | | | |

Commercial Cars

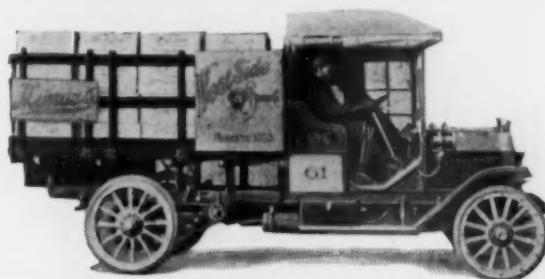
| | | | | | | | | | | | |
|---|----|-----|----|---|----|----------|------|-------|----|----|----|
| SL | BR | S | .. | F | .. | 36x3 1/2 | 36x4 | R 120 | 75 | .. | .. |
| Buckeye Mfg. Co., Anderson, Ind. | | | | | | | | | | | |
| .. | B | S | W | S | 4 | 31x3 1/2 | 38x5 | L 140 | 75 | .. | .. |
| Crown Commercial Car Co., Milwaukee, Wis. | | | | | | | | | | | |
| SL | B | S | C | S | 3 | 36x3 1/2 | 36x4 | C 115 | 65 | .. | .. |
| Danielson Engine Works, Chicago, Ill. | | | | | | | | | | | |
| SB | O | S | C | S | 3 | 36x4 | 36x5 | L 145 | 63 | .. | .. |
| Detroit Wyandotte Motor Co., Wyandotte, Mich. | | | | | | | | | | | |
| R | B | S | W | S | 3 | 36x3 1/2 | 36x5 | R 127 | 75 | .. | .. |
| R | B | S | W | S | 3 | 36x3 1/2 | 36x5 | R 144 | 75 | .. | .. |
| Diamond T. Motor Car Co., Chicago, Ill. | | | | | | | | | | | |
| SB | E | S | C | S | 2 | 36x3 1/2 | 36x4 | L 144 | 80 | .. | .. |
| S. G. Gay Co., Ottawa, Ill. | | | | | | | | | | | |
| H | E | S | C | S | 3 | 31x3 1/2 | 38x4 | L 130 | 80 | .. | .. |
| Harvey Motor Truck Works, Harvey, Ill. | | | | | | | | | | | |
| SB | D | S | S | S | 3 | 36x4 | 36x4 | R 124 | 55 | .. | .. |
| Four Wheel Drive Auto Co., Clintonville, Wis. | | | | | | | | | | | |
| .. | E | .. | C | S | 3 | 36x3 1/2 | 36x5 | L 120 | .. | .. | .. |
| .. | E | .. | C | S | 3 | 36x3 1/2 | 36x5 | L 144 | .. | .. | .. |
| Federal Motor Truck Co., Detroit, Mich. | | | | | | | | | | | |
| R | B | 1/4 | C | S | 3 | 36x3 1/2 | 36x4 | L 132 | 75 | .. | .. |
| Fargo Motor Car Co., Chicago, Ill. | | | | | | | | | | | |
| R | B | S | IG | S | 4 | 36x4 | 36x4 | L 125 | 53 | .. | .. |
| Thomas H. Jeffery Co., Kenosha, Wis. | | | | | | | | | | | |
| SB | B | S | C | S | 4 | .. | .. | L 144 | 74 | .. | .. |
| Kissel Motor Car Co., Hartford, Wis. | | | | | | | | | | | |
| K | B | S | C | S | 3 | 36x3 | 36x4 | R 110 | 80 | .. | .. |
| Kalamazoo Motor Vehicle Co., Kalamazoo, Mich. | | | | | | | | | | | |



JEFFERY 3000-LB. QUADRUPLE DRIVE ARMY WAGON, CHASSIS, \$3000.



MORELAND 2500-LB. COVERED FLARE BOARD BODY. Made by Moreland Motor Truck Co., Los Angeles, Cal.



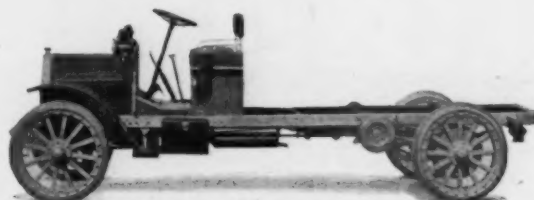
GMC MODEL VC, 2500-LB. STAKE BODY, CHASSIS, \$1500. Made by General Motors Truck Co.



KISSEL KAR 3000-LB. STAKE BODY, CHASSIS, \$2100.



DIAMOND T, 3000-LB. FLARE BOARD, CHASSIS, \$2250.



FEDERAL 3000-LB. CHASSIS, \$1820. This chassis fitted with stake body, 126x60, \$1970; flare board, 126x48, \$1945; covered express, 126x48, \$2200.



WISCONSIN MODEL A, 3000-LB. STAKE BODY, \$1825.



SERVICE MODEL Q, 3000-LB. SCREEN SIDE CHASSIS, \$1800.

3000 Pound Gasoline

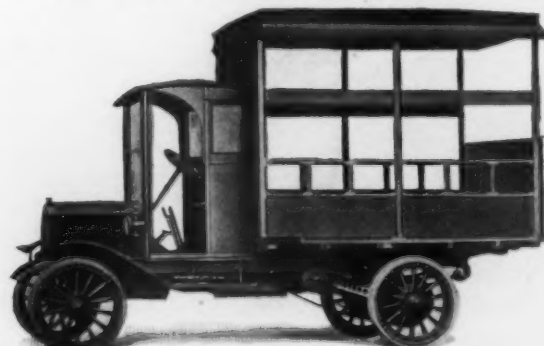
| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P't'm | Maximum Speed | Horse Power | Cylinders | Bore | Stroke | Cylinders Cast | Cooling | Radiator |
|---|----------------|---------------|------------------------------|-------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|
| Wm. Landshaft & Sons, Chicago, Ill. | | | | | | | | | | | | |
| J | 3800 | 1800 | 60x120 | 36 | 12 | 23 | 4 | 3.75 | 5.5 | B | C | H |
| W. H. McIntyre Co., Auburn, Ind. | | | | | | | | | | | | |
| A | 3600 | 2300 | 42 | 15 | 27 | 4 | 4.13 | 5.25 | | B | T | T |
| Mais Motor Truck Co., Indianapolis, Ind. | | | | | | | | | | | | |
| C | 5100 | 2750 | 34 | 15 | 26 | 4 | 4 | 5.25 | | P | C | V |
| D | 5200 | 2800 | 34 | 15 | 26 | 4 | 4 | 5.25 | | P | C | V |
| Joseph W. Moon Buggy Co., St. Louis, Mo. | | | | | | | | | | | | |
| B | 1800 | 1800 | 18 | 23 | 4 | 3.75 | 5.25 | | | B | C | H |
| B | 1800 | 1800 | 18 | 23 | 4 | 3.75 | 5.25 | | | B | C | H |
| D. F. Poyer Co., Menominee, Mich. | | | | | | | | | | | | |
| C | 3875 | 1800 | 60x120 | 38 | 18 | 26 | 4 | 5 | | P | T | V |
| Robinson Motor Truck Co., Minneapolis, Minn. | | | | | | | | | | | | |
| F | 126 | 2200 | | | | 4 | | | | P | W | |
| Service Motor Car Co., Wabash, Ind. | | | | | | | | | | | | |
| Q | 4000 | 1800 | | 14 | 29 | 4 | 4.25 | 5.5 | | B | C | H |
| Sandow Truck Co., Chicago, Ill. | | | | | | | | | | | | |
| .... | 1800 | 48x90 | 38 | 17 | 23 | 4 | 3.75 | 5.25 | | B | C | H |
| .... | 1800 | 48x90 | 38 | 17 | 23 | 4 | 3.75 | 5.25 | | B | C | H |
| Universal Motor Truck Co., Detroit, Mich. | | | | | | | | | | | | |
| C | 3500 | 1950 | 35 | 15 | 23 | 4 | 3.75 | 5 | | B | T | T |
| Ideal Auto Co., Fort Wayne, Ind. | | | | | | | | | | | | |
| H-2 | 3500 | 2000 | 54x120 | 40 | 25 | 27 | 4 | 4.13 | 5.25 | B | C | V |
| Star Motor Car Co., Ann Arbor, Mich. | | | | | | | | | | | | |
| A | 3875 | 1800 | 99 | 42 | 15 | 27 | 4 | 4.13 | 5.25 | B | C | H |
| Continental Truck Mfg. Co., Superior, Wis. | | | | | | | | | | | | |
| AE | 3000 | 1500 | 48x144 | 36 | 15 | 20 | 4 | 3.5 | 5.5 | B | T | H |
| Harder Auto Truck Co., Chicago, Ill. | | | | | | | | | | | | |
| .... | 4750 | 2250 | 60x120 | 18 | 26 | 4 | 4 | 4 | | P | C | V |
| .... | 4750 | 2500 | 60x120 | 18 | 26 | 4 | 4 | 4 | | P | C | V |
| Wisconsin Motor Truck Works, Baraboo, Wis. | | | | | | | | | | | | |
| A | 4000 | 1700 | 36 | 15 | 29 | 4 | 4.25 | 5.75 | | P | C | H |

KALAMAZOO MODEL B, 3000-LB. STAKE BODY, \$1715.
This chassis also fitted with express body, \$1690.SANDOW 3000-LB. PANEL BODY, \$2050.
Carrying space, 96x48 in. This chassis also fitted with stake body, 96x60 in., \$2000; flare board, 96x48 in., \$1975.

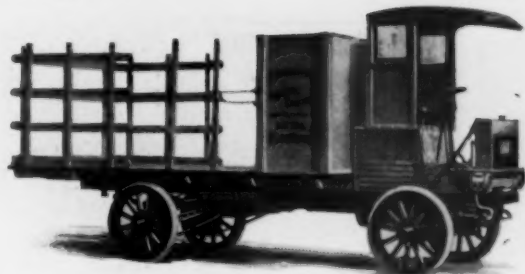
MOON MODEL B, 3000-LB. FLARE BOARD, \$1900.



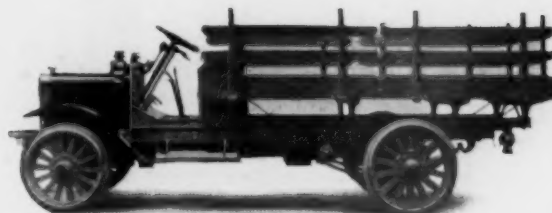
MOON MODEL B, 3000-LB. CANOPY TOP, \$1950.



MOON MODEL B, 3000-LB. SPECIAL BODY, \$2150.

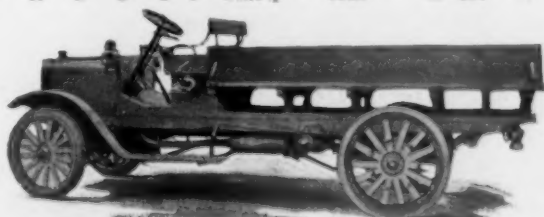
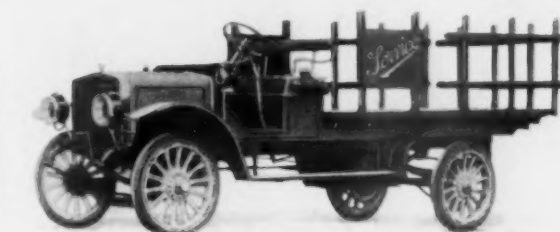


ROBINSON MODEL F, 3000-LB. STAKE BODY, CHASSIS, \$2200.

STAR MODEL A, 3000-LB. STAKE BODY, \$1950.
Carrying space, 99 in. long.

Commercial Cars

| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|--|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
| R B | S | | | | | | | | | | |
| Wm. Landshaft & Sons, Chicago, Ill. | | | | | | | | | | | |
| R | B | S | C | S | 3 | 34x3 1/2 | 36x4 | R | 134 | 70 | .. |
| W. H. McIntyre Co., Auburn, Ind. | | | | | | | | | | | |
| S | BR | S | C | S | 3 | 34x3 1/2 | 36x3D | R | 130 | 70 | .. |
| Mais Motor Truck Co., Indianapolis, Ind. | | | | | | | | | | | |
| R | E | .. | IG | P | 3 | 36x4 | 36x5 | .. | 119 | .. | .. |
| R | E | .. | IG | P | 3 | 36x4 | 36x5 | .. | 132 | .. | .. |
| Joseph W. Moon Buggy Co., St. Louis, Mo. | | | | | | | | | | | |
| SB | R | .. | C | S | 3 | 36x3 1/2 | 36x4 1/2 | L | 125 | 80 | G |
| SB | R | .. | C | S | 3 | 36x3 1/2 | 36x4 1/2 | L | 140 | 80 | G |
| D. F. Poyer Co., Menominee, Mich. | | | | | | | | | | | |
| SB | B | .. | B | S | 3 | 36x4 | 36x5 | R | 130 | 60 | .. |
| Robinson Motor Truck Co., Minneapolis, Minn. | | | | | | | | | | | |
| .. | .. | .. | .. | .. | .. | 36x4 | 36x4 | .. | 120 | .. | .. |
| Service Motor Car Co., Wabash, Ind. | | | | | | | | | | | |
| SB | E | S | B | S | 3 | 36x3 1/2 | 36x5 | L | 145 | 85 | .. |
| Sandow Truck Co., Chicago, Ill. | | | | | | | | | | | |
| SB | B | S | C | S | 3 | 36x3 1/2 | 36x4 | R | 135 | 75 | .. |
| SB | B | S | C | S | 3 | 36x3 1/2 | 36x4 | R | 145 | 75 | .. |
| Universal Motor Truck Co., Detroit, Mich. | | | | | | | | | | | |
| GA | E | S | W | S | 3 | 34x4 | 34x4 1/2 | .. | 130 | 71 | .. |
| Ideal Auto Co., Fort Wayne, Ind. | | | | | | | | | | | |
| SB | E | 1/2 | C | S | 3 | 36x3 1/2 | 36x4 | R | 124 | 68 | .. |
| Star Motor Car Co., Ann Arbor, Mich. | | | | | | | | | | | |
| O | O | .. | C | S | 3 | 34x3 1/2 | 36x5 | L | 130 | 67 | .. |
| Continental Truck Mfg. Co., Superior, Wis. | | | | | | | | | | | |
| SB | B | 1/2 | C | S | 3 | 34x3 1/2 | .. | .. | 130 | 60 | .. |
| Harder Auto Truck Co., Chicago, Ill. | | | | | | | | | | | |
| O | .. | .. | C | S | 3 | .. | .. | R | 110 | .. | .. |
| O | .. | .. | C | S | 3 | .. | .. | R | 110 | .. | .. |
| Wisconsin Motor Truck Works, Baraboo, Wis. | | | | | | | | | | | |
| H | R | S | C | S | 3 | 34x3 1/2 | 38x5 | L | 130 | .. | .. |

MONITOR MODEL F, 3000-LB. OPEN EXPRESS, \$2050.
This chassis also fitted with stake body, \$2050.

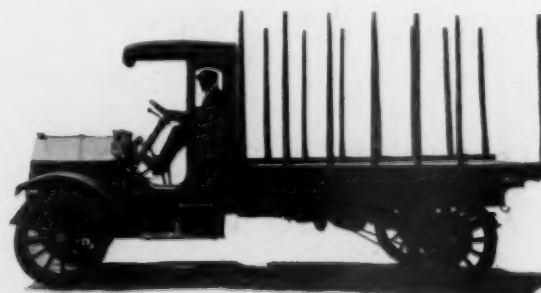
SERVICE MODEL M, 3000-LB. STAKE BODY, CHASSIS, \$1650.

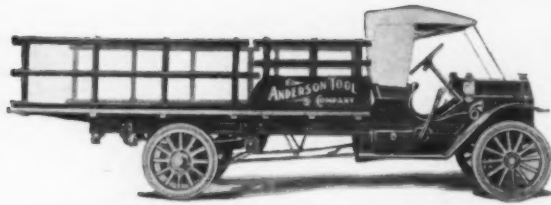


MAIS MODEL D, 3000-LB. PANEL BODY, CHASSIS, \$2800.

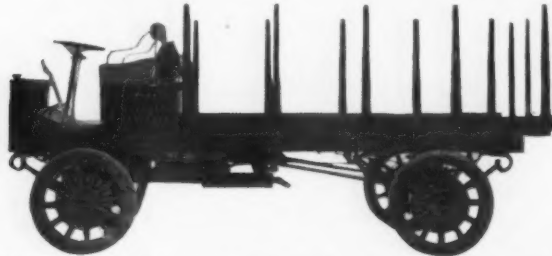
MENOMINEE MODEL C, 3000-LB. STAKE BODY, \$1950.
Made by D. F. Poyer Co.
Carrying space 120x60 in. This chassis also fitted with panel body; flare board body, 114x52 in., \$1950.

UNIVERSAL MODEL C, 3000-LB. CANOPY TOP, CHASSIS, \$1950.

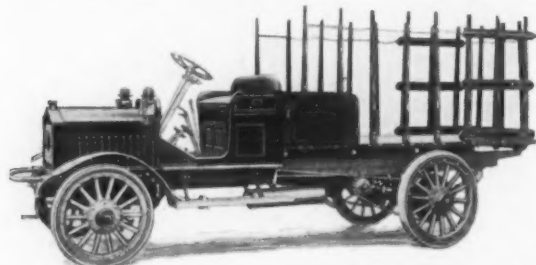
LANDSHAFT MODEL J, 3000-LB. STAKE BODY, \$1900.
Carrying space, 120x60 in.



LAMBERT MODEL V-5, 4000-LB. STAKE BODY, \$2300.
Made by Buckeye Mfg. Co.
This chassis also fitted with panel and flare board bodies, same price.



DUPLEX MODEL B-2, 4000-LB. STAKE BODY, CHASSIS, \$2800.



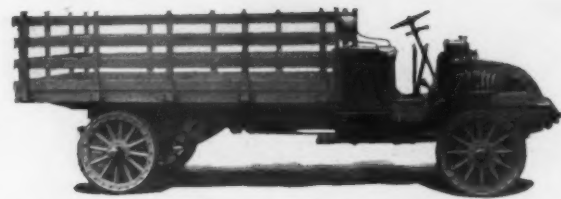
BECK MODEL F, 4000-LB. STAKE BODY, \$1875.
Carrying space, 126x52 in. This chassis also fitted with panel body, \$2000; flare board, \$2000, both same carrying space.



TWIN CITY 4000-LB. FLARE BOARD, \$1450.
Made by Brasie Motor Truck Co.
Carrying space, 120x48 in. This chassis also fitted with stake body, same carrying space, same price.



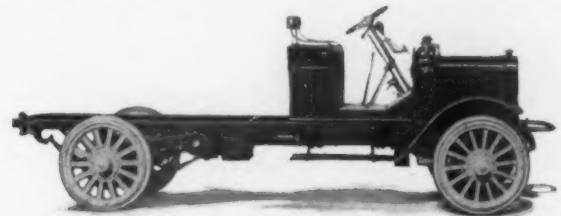
MORELAND 4000-LB. STAKE BODY.
Made by Moreland Motor Truck Co., Los Angeles, Cal.



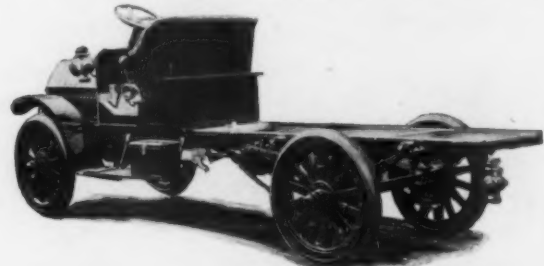
HORNER 4000-LB. STAKE BODY, CHASSIS, \$2650.
Made by the Detroit-Wyandotte Motor Co.

4000 Pound Gasoline

| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P't'm | Maximum Speed | Horse Power | Cylinders | Bore | Stroke | Cylinders Cast | Cooling | Radiator |
|--|----------------|---------------|------------------------------|-------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|
| Avery Co., Peoria, Ill. | | | | | | | | | | | | |
| B | 5450 | 2700 | | 14 | 36 | 4 | 4.75 | 5 | | | S C | V |
| Beck & Son, Cedar Rapids, Iowa. | | | | | | | | | | | | |
| F | 4000 | 1800 | 54x120x72 | 40 | 18 | 35 | 4 | 4.25 | 5.5 | | B C | H |
| Brasie Motor Truck Co., Minneapolis, Minn. | | | | | | | | | | | | |
| .... | 3000 | 1350 | 48x120 | 34 | 15 | 20 | 2 | 5 | | | S T | T |
| Buckeye Mfg. Co., Anderson, Ind. | | | | | | | | | | | | |
| V-5 | 5500 | 2200 | | | | 32 | 4 | 4.5 | 5 | | P C | V |
| Crown Commercial Car Co., Milwaukee, Wis. | | | | | | | | | | | | |
| C | 3700 | 3000 | | 36 | 12 | 29 | 4 | 4.5 | 5 | | P C | V |
| Dart Mfg. Co., Waterloo, Iowa. | | | | | | | | | | | | |
| C | 3475 | 1775 | | 47 | 15 | 27 | 4 | 4.13 | 5.5 | | B C | H |
| Detroit Wyandotte Motor Co., Wyandotte, Mich. | | | | | | | | | | | | |
| 2 | 4578 | 2650 | | 40 | 15 | 27 | 4 | 4.13 | 5.25 | | B C | T |
| Amalgamated Motors Corp., Alhambra, Cal. | | | | | | | | | | | | |
| .... | 3650 | 2100 | | 42 | 25 | 27 | 4 | 4.13 | 5.25 | | B C | H |
| De Kalb Wagon Co., De Kalb, Ill. | | | | | | | | | | | | |
| D-2 | 4800 | 2600 | | 42 | 15 | 27 | 4 | 4.13 | 5.25 | | B C | H |
| D-2 | 4800 | 2600 | | 42 | 15 | 27 | 4 | 4.13 | 5.25 | | B C | H |
| General Motors Truck Co., Pontiac, Mich. | | | | | | | | | | | | |
| SC | .... | 1900 | | 12 | 26 | 4 | 4 | 6 | | | B W | .. |
| Mogul Motor Truck Co., St. Louis, Mo. | | | | | | | | | | | | |
| L | 4500 | 2360 | | 31 | 15 | 27 | 4 | 4.13 | 5.25 | | B C | C |
| Mais Motor Truck Co., Indianapolis, Ind. | | | | | | | | | | | | |
| E | 5300 | 2950 | | 34 | 13 | 26 | 4 | 4 | 5.25 | | P C | V |
| F | 5400 | 3000 | | 34 | 13 | 26 | 4 | 4 | 5.25 | | P C | V |
| O. K. Motor Truck Co., Detroit, Mich. | | | | | | | | | | | | |
| A | 4500 | 1850 | | 28 | 15 | 27 | 4 | 4.13 | 5.25 | | B C | T |
| Old Reliable Motor Truck Co., Chicago, Ill. | | | | | | | | | | | | |
| .... | 4750 | 2750 | | 42 | 15 | 29 | 4 | 4.25 | 5 | | P C | C |
| Nelson & Le Moon, Chicago, Ill. | | | | | | | | | | | | |
| D2 | 4250 | 2250 | | 36 | 13 | 27 | 4 | 4.13 | 5.25 | | B C | V |
| Packard Motor Car Co., Detroit, Mich. | | | | | | | | | | | | |
| .... | 5200 | 2800 | | 38 | 14 | 26 | 4 | 4.06 | 5.13 | | P C | H |
| Pacific Metal Products Co., Torrance, Cal. | | | | | | | | | | | | |
| B | 5500 | 2650 | | 25 | 16 | 27 | 4 | 4.13 | 5.25 | | B C | V |



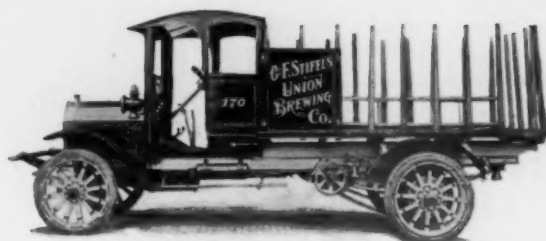
O. K. MODEL A, 4000-LB. CHASSIS, \$1850.
This chassis fitted with panel body, \$2100; stake body, \$1975; flare board, \$2025.



DE KALB MODEL D-2, 4000-LB. CHASSIS, \$2600.



DART MODEL C, 4000-LB. FLARE BOARD, CHASSIS, \$1775.

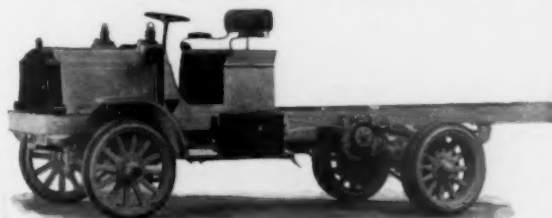


DORRIS 4000-LB. STAKE BODY, CHASSIS, \$2500.

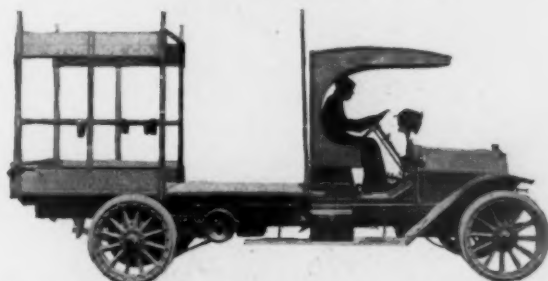
Commercial Cars

| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|------------|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
|------------|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|

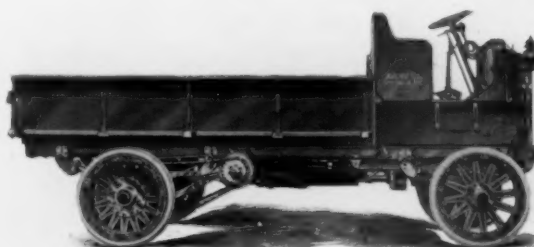
| | | | | | | | | | | | |
|----|----|-----|----|---|----|----------|------------|----|-----|----|----|
| R | E | .. | C | S | 3 | 36x4 | 36x3 1/2 D | R | 128 | .. | .. |
| SB | B | M | C | S | 3 | 34x3 1/2 | 38x4 | L | 130 | 65 | E |
| SL | KW | 1/2 | C | L | 2 | 34x3 | 36x3 1/2 | R | 104 | 65 | .. |
| SL | BR | S | .. | F | .. | 36x4 | 36x5 | R | 120 | 75 | .. |
| SB | V | S | W | S | 4 | 34x4 | 38x4 D | L | 150 | 75 | .. |
| SB | E | M | B | S | 3 | 34x3 | 38x4 | L | 130 | 70 | .. |
| SB | O | S | C | S | 3 | 36x4 | 36x3 1/2 D | L | 145 | 66 | .. |
| SL | B | 1/2 | C | S | 3 | 34x4 | 34x3 1/2 | R | 120 | 70 | E |
| SB | B | S | C | S | 3 | 36x4 | 36x3 1/2 D | L | 136 | 65 | .. |
| SB | B | 1/2 | C | S | 3 | 36x4 | 36x3 1/2 D | L | 144 | 65 | .. |
| K | B | .. | C | S | 3 | 34x4 | 36x3 1/2 D | L | 143 | .. | .. |
| SB | E | S | C | S | 3 | 36x5 | 38x6 | L | 138 | 68 | .. |
| R | E | .. | IG | P | 3 | 36x4 | 36x4 D | .. | 132 | .. | .. |
| R | E | .. | IG | P | 3 | 36x4 | 36x4 D | .. | 145 | .. | .. |
| SB | B | S | C | S | 3 | 36x4 | 36x5 | L | 144 | 65 | E |
| SB | B | 1/2 | C | S | 3 | 36x4 | 36x3 D | R | 120 | .. | .. |
| R | B | M | C | S | 3 | .. | .. | R | .. | 80 | .. |
| SP | E | .. | C | P | 3 | 34x3 1/2 | 34x3 D | R | 144 | 85 | .. |
| SL | B | 1/2 | C | S | 3 | 36x4 | 36x3 1/2 D | L | 150 | 60 | .. |



PACKARD 4000-LB. CHASSIS, \$2800.

MOORE MODEL B, 4000-LB. STAKE BODY, CHASSIS, \$2650.
Made by Pacific Metal Products Co.

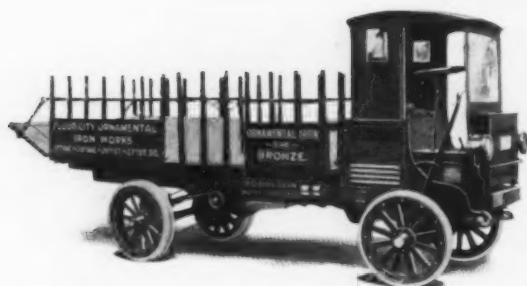
NELSON & LE MOON MODEL D-2, 4000-LB. FLARE BOARD, CHASSIS, \$2250.



AVERY MODEL B, 4000-LB. FLARE BOARD BODY.



OLD RELIABLE 4000-LB. SLAT SIDE STAKE BODY, CHASSIS, \$2750.



ROBINSON MODEL D, 4000-LB. STAKE BODY, CHASSIS, \$2500.



SERVICE MODEL P, 4000-LB. STAKE BODY, CHASSIS, \$2375.

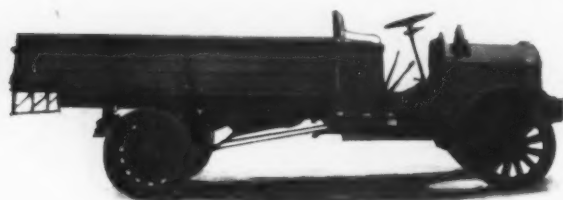
4000 Pound Gasoline

| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P't'n | Maximum Speed | Horse Power | Cylinders | Bore | Stroke | Cylinders Cast | Cooling | Radiator |
|-------|----------------|---------------|------------------------------|-------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|
|-------|----------------|---------------|------------------------------|-------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|

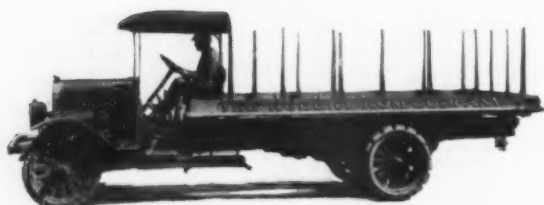
| | | | | | | | | | | | | |
|-----|------|------|------------|------------|------|------|------|--|--|--|--------|--|
| N | 4700 | 2500 | 36 15 29 4 | 4.25 | 4.5 | | | | | | P W V | |
| ... | 4200 | 2000 | 42 15 27 4 | 4.13 | 5.25 | | | | | | B C H | |
| ... | 4100 | 2500 | 15 29 4 | 4.25 | 5 | | | | | | P C H | |
| J | 3700 | 1650 | 43 12 26 4 | 4 | 4.5 | | | | | | P C V | |
| J | 3700 | 1650 | 43 12 26 4 | 4 | 4.5 | | | | | | P C V | |
| D | ... | 2500 | 138 | ... | ... | | | | | | P W .. | |
| ... | 4500 | 2800 | 43 15 29 4 | 4.25 | 6.75 | | | | | | P C V | |
| ... | 4500 | 2800 | 43 15 29 4 | 4.25 | 6.75 | | | | | | P C V | |
| ... | 4500 | 2800 | 43 15 29 4 | 4.25 | 6.75 | | | | | | P C V | |
| ... | 4250 | 2950 | 15 27 4 | 4.13 | 5.25 | | | | | | B C T | |
| P | 5900 | 2375 | 12 27 4 | 4.13 | 5.5 | | | | | | B C H | |
| ... | ... | 2200 | 48x96 | 38 14 23 4 | 3.75 | 5.25 | | | | | B C H | |
| ... | ... | 2200 | 48x96 | 38 14 23 4 | 3.75 | 5.25 | | | | | B C H | |
| Y | 5500 | 2850 | 66x144 | 42 15 32 4 | 4.5 | 5.5 | | | | | P C H | |
| Y | 5500 | 2850 | 66x144 | 42 15 32 4 | 4.5 | 5.5 | | | | | P C H | |
| B | 3260 | 2100 | 30 | 20 4 | 3.5 | 5 | | | | | B T H | |
| 30 | 3800 | 1675 | 48x116 | 29 22 26 4 | 4 | 5 | | | | | P T C | |
| ... | 4250 | 2500 | 15 30 4 | 4.38 | 5 | | | | | | P C T | |
| ... | 3600 | 2800 | 113 | 17 26 4 | 4.5 | | | | | | P C .. | |
| ... | ... | 2750 | 148x60 | 15 | 29 4 | 4.25 | 4.75 | | | | P C V | |
| ... | ... | 3000 | 148x60 | 15 | 29 4 | 4.25 | 4.75 | | | | P C V | |
| ... | ... | 5250 | 168x66 | 15 | 36 4 | 4.75 | 5 | | | | P C V | |

5000 Pound Gasoline

| | | | | | | | | | | | | |
|-----|------|------|------------|------------|------|-----|--|--|--|--|-------|--|
| C | 4500 | 3000 | 31 15 36 4 | 4.75 | 5.5 | | | | | | P C V | |
| ... | 5300 | 2750 | 46 13 32 4 | 4.5 | 5.25 | | | | | | P C T | |
| G | 5500 | 3200 | 34 12 26 4 | 4 | 5.25 | | | | | | P C V | |
| 21 | 5200 | 3250 | 36x162 | 38 15 29 4 | 4.25 | 5 | | | | | P C H | |
| K | 4900 | 2500 | 60x144 | 41 18 32 4 | 4.5 | 5.5 | | | | | P C V | |



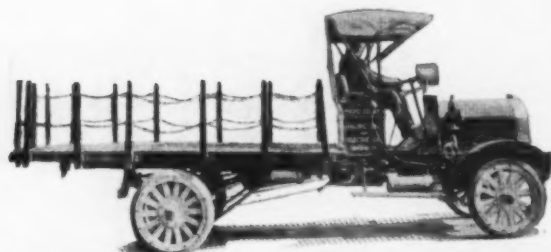
LEWIS 5000-LB. FLARE BOARD BODY.



KISSEL KAR 5000-LB. STAKE BODY, CHASSIS, \$2750.



SANDOW 5000-LB. CANOPY TOP, CHASSIS, \$2200.
Carrying space, 120x48 in. This chassis also fitted with panel body, 108x48 in., \$2500; stake body, 120x60 in., \$2150; flare board, 120x48 in., \$2400.



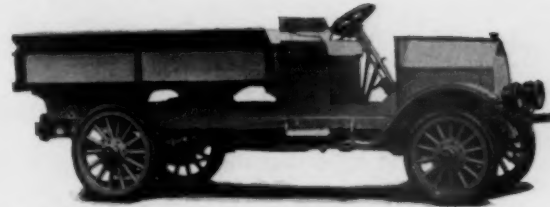
LEWIS MODEL 21, 5000-LB. STAKE BODY, CHASSIS, \$3250.



WILCOX MODEL N, 4000-LB. SCREEN SIDE WITH CAB, \$2800.



STERNBERG 4000-LB. STAKE BODY, CHASSIS, \$2800.

SOUTH BEND MODEL 30, 4000-LB. FLARE BOARD, \$1750.
Carrying space, 116x48 in.

Commercial Cars

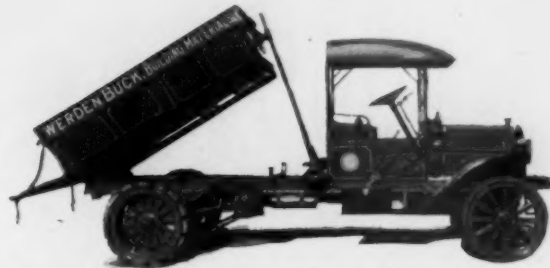
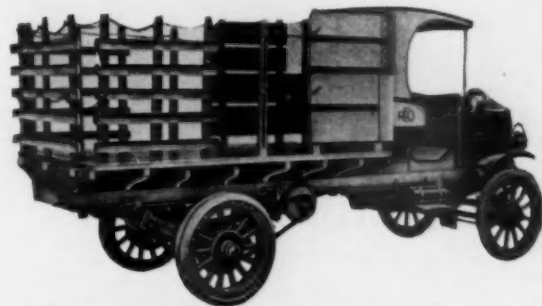
| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|------------|----------|-----------------|------------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
| O O | 1/2 | C S 3 4 | 5 | R | 117 | 60 | .. | | | | |
| SP B | 1/2 | C S 3 34x4 | 34x5 | L | 144 | 65 | .. | | | | |
| SB P | S | C S 3 | ..... | D | 128 | 80 | .. | | | | |
| H N | 1/2 | C S 3 36x4 | 36x3D | L | 130 | 80 | .. | | | | |
| H N | 1/2 | C S 3 36x4 | 36x3D | L | 146 | 80 | .. | | | | |
| .. | .. | .. | .. | .. | .. | .. | .. | | | | |
| H E | 2 | C 1C 3 34x4 | 36x5 | R | 116 | 65 | .. | | | | |
| H E | 2 | C 1C 3 34x4 | 36x5 | R | 140 | 65 | .. | | | | |
| H E | 2 | C 1C 3 34x4 | 36x5 | R | 164 | 65 | .. | | | | |
| C E | .. | C S 3 34x3 1/2 | 36x3 1/2 | L | 142 | 85 | .. | | | | |
| SB E | S | B S 3 36x4 | 40x3 1/2 D | L | 150 | 85 | .. | | | | |
| SB B | S | C S 3 36x4 | 36x3 1/2 D | R | 135 | 75 | .. | | | | |
| SB B | S | C S 3 36x4 | 36x3 1/2 D | R | 160 | 75 | .. | | | | |
| SB B | S | C S 3 36x4 | 36x4D | R | 148 | 80 | .. | | | | |
| SB B | S | C S 3 36x4 | 36x4D | R | 172 | 80 | .. | | | | |
| C B | .. | C S 3 34x3 1/2 | 34x5 | R | 118 | 75 | .. | | | | |
| SB BR | S | C S 3 34x3 1/2 | 38x4 | L | 130 | .. | .. | | | | |
| F B | S | C S 3 34x3 1/2 | 36x3 1/2 D | L | 144 | .. | .. | | | | |
| M E | .. | IG S 3 34x3 1/2 | 34x3 1/2 | L | 114 | .. | .. | | | | |
| O .. | .. | C S 3 | ..... | R | 124 | .. | .. | | | | |
| O .. | .. | C S 3 | ..... | R | 124 | .. | .. | | | | |
| O .. | .. | C S 3 | ..... | .. | 140 | .. | .. | | | | |

Commercial Cars

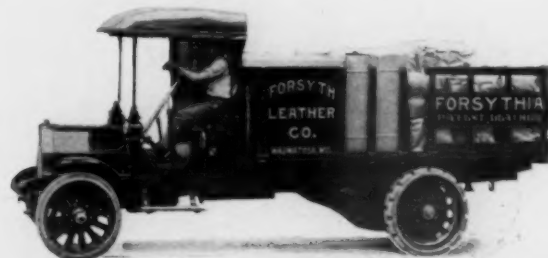
| | | | | | | | |
|------|-----|-------------|------------|----|-----|----|----|
| .. B | S | W S 4 34x4 | 34x4D | L | 150 | 75 | .. |
| SB B | S | C S 4 | ..... | D | 156 | 75 | .. |
| R E | .. | IG P 3 36x4 | 36x4D | .. | 145 | .. | .. |
| R B | S | C IG 3 34x4 | 36x4D | R | 144 | 65 | .. |
| SB E | 1/2 | C S 3 36x4 | 36x3 1/2 D | R | 134 | 70 | .. |



PALMER-MEYER 4000-LB. STAKE BODY, CHASSIS, \$2000.

VELIE MODEL Y, 4000-LB. DUMPING BODY, CHASSIS, \$2850.
This chassis also fitted with stake body, 144x66 in., \$3000.REO MODEL J, 4000-LB. HIGH STAKE BODY, \$1825.
This chassis also fitted with stake body, \$1800; flare board, \$1800; canopy top, \$1850; screen side, \$1875.

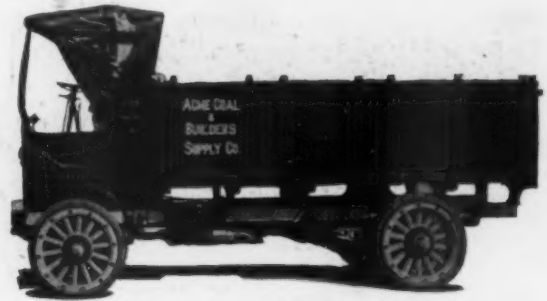
WICHITA FALLS MODEL B, 4000-LB. STAKE BODY, CHASSIS, \$2100.



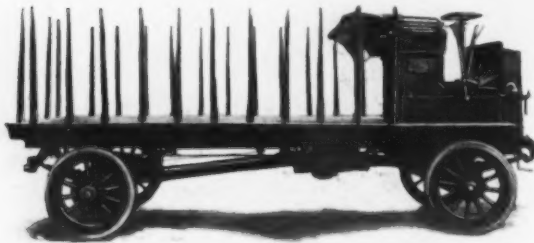
STEGEMAN 4000-LB. STAKE BODY, CHASSIS, \$2950.



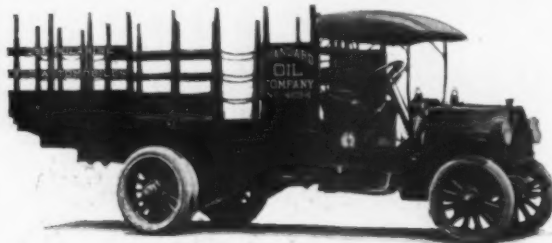
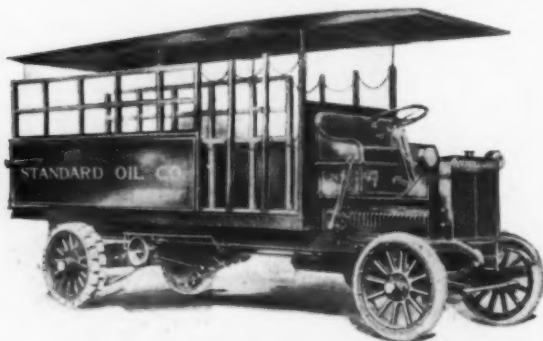
PACKARD 6000-LB. CHASSIS, \$3400.



UNIVERSAL MODEL A, 6000-LB. SIDED PLATFORM, CHASSIS, \$3200.



NEVADA MODEL H, 6000-LB. STAKE BODY, CHASSIS, \$3500.

VELIE MODEL Z, 6000-LB. STAKE BODY, \$3500.
Carrying space, 168x78 in.MORELAND 6000-LB. COVERED STAKE BODY.
Made by Moreland Motor Truck Co., Los Angeles, Cal.

STERNBERG 6000-LB. PLATFORM BODY, CHASSIS, \$3400.

6000 Pound Gasoline

| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P't'm | Maximum Speed | Horse Power | Cylinders | Bore | Stroke | Cylinders Cast | Cooling | Radiator | |
|--|----------------|---------------|------------------------------|-------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|---|
| H. E. Wilcox Motor Co., Minneapolis, Minn. | | | | | | | | | | | | | |
| JA | 5500 | 3250 | | 37 12 29 4 | 4.25 | 5 | | | | | P | W | V |
| Nevada Mfg. Co., Nevada, Iowa. | | | | | | | | | | | | | |
| .... | 5400 | 3500 | 72x144 | 36 12 32 4 | 4.5 | 6.75 | | | | | P | C | T |
| Avery Co., Peoria, Ill. | | | | | | | | | | | | | |
| B | 6250 | 3200 | | 13 36 4 | 4.75 | 5 | | | | | S | C | V |
| Beck & Son, Cedar Rapids, Iowa. | | | | | | | | | | | | | |
| E | 5000 | 2000 | 60x144 | 40 16 50 4 | 5 | 6 | | | | | B | C | H |
| Crown Commercial Car Co., Milwaukee, Wis. | | | | | | | | | | | | | |
| D | 4200 | 3500 | | 36 12 29 4 | 4.25 | 5 | | | | | P | C | V |
| Detroit Wyandotte Motor Co., Wyandotte, Mich. | | | | | | | | | | | | | |
| 3 | 6850 | 3200 | | 48 12 32 4 | 4.5 | 5.5 | | | | | P | C | T |
| Four Wheel Drive Auto Co., Clintonville, Wis. | | | | | | | | | | | | | |
| .... | 6400 | 4000 | | 45 12 36 4 | 4.75 | 5.5 | | | | | P | C | H |
| Mais Motor Truck Co., Indianapolis, Ind. | | | | | | | | | | | | | |
| H | 5600 | 3400 | | 34 12 26 4 | 4 | 5.25 | | | | | P | C | V |
| Nelson & Le Moon, Chicago, Ill. | | | | | | | | | | | | | |
| D3 | 6450 | 2750 | | 36 12 32 4 | 4.5 | 5.5 | | | | | P | C | V |
| Pacific Metal Products Co., Torrance, Cal. | | | | | | | | | | | | | |
| D | 8000 | 3500 | | 30 12 32 4 | 4.5 | 5.5 | | | | | P | C | V |
| Packard Motor Car Co., Detroit, Mich. | | | | | | | | | | | | | |
| .... | 6400 | 3400 | | 40 12 32 4 | 4.5 | 5.5 | | | | | P | C | H |
| Sternberg Mfg. Co., Milwaukee, Wis. | | | | | | | | | | | | | |
| .... | 6000 | 3400 | | 47 12 29 4 | 4.25 | 6.75 | | | | | P | C | V |
| .... | 6000 | 3400 | | 47 12 29 4 | 4.25 | 6.75 | | | | | P | C | V |
| Standard Motor Truck Co., Detroit, Mich. | | | | | | | | | | | | | |
| .... | 6100 | 2750 | 72x144 | 40 12 32 4 | 4.5 | 5.5 | | | | | P | G | T |
| Stegeman Motor Car Co., Milwaukee, Wis. | | | | | | | | | | | | | |
| .... | 5600 | 3500 | | 12 32 4 | 4.5 | 5.5 | | | | | P | C | T |
| Service Motor Car Co., Wabash, Ind. | | | | | | | | | | | | | |
| H | 7670 | 2975 | | 10 27 4 | 4.13 | 5.5 | | | | | B | C | H |
| Universal Motor Truck Co., Detroit, Mich. | | | | | | | | | | | | | |
| A | 4800 | 3200 | | 43 12 26 4 | 4 | 5 | | | | | P | C | H |
| A | 4800 | 3200 | | 43 12 26 4 | 4 | 5 | | | | | P | C | H |
| Velle Motor Vehicle Co., Moline, Ill. | | | | | | | | | | | | | |
| Z | 6500 | 3350 | 78x168 | 42 12 32 4 | 4.5 | 5.5 | | | | | P | C | H |
| Z | 6500 | 3350 | 78x168 | 42 12 32 4 | 4.5 | 5.5 | | | | | P | C | H |
| Wasatch Motor Mfg. Co., Salt Lake City, Utah. | | | | | | | | | | | | | |
| D | 6700 | 3500 | | 35 12 27 4 | 4.13 | 5.25 | | | | | B | C | H |



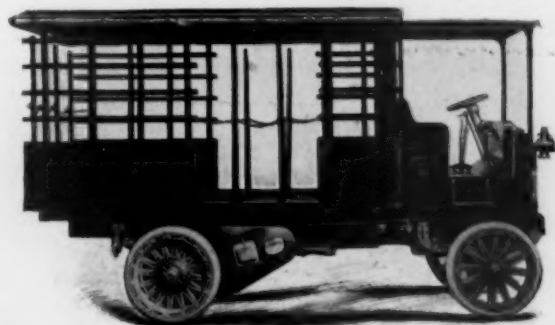
FOUR-WHEEL DRIVE, MODEL B, 6000-LB. STAKE BODY, CHASSIS, \$4000.



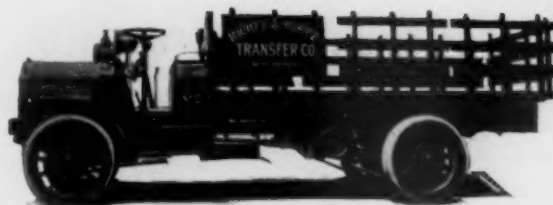
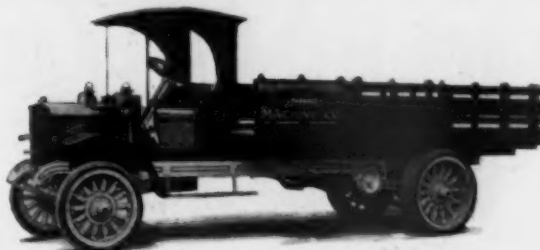
WILCOX MODEL JA, 6000-LB. MOVING VAN, \$3700.

Commercial Cars

| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|--|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
| H. E. Wilcox Motor Co., Minneapolis, Minn. | | | | | | | | | | | |
| O B | S | C | S | 3 | 4 | 4D | R 128 | 60 | .. | .. | .. |
| Nevada Mfg. Co., Nevada, Iowa. | | | | | | | | | | | |
| H B | S | B | S | 3 | 36x6 | 36x6 | R 144 | 50 | .. | .. | .. |
| Avery Co., Peoria, Ill. | | | | | | | | | | | |
| R E | .. | C | S | 3 | 38x5D | 38x4D | R 128 | .. | .. | .. | .. |
| Beck & Son, Cedar Rapids, Iowa. | | | | | | | | | | | |
| SB B | M | C | S | 3 | 34x4 | 38x3 1/2 D | L 130 | 65 | E | .. | .. |
| Crown Commercial Car Co., Milwaukee, Wis. | | | | | | | | | | | |
| SB B | S | W | S | 4 | 34x4 | 38x4 1/2 D | L 165 | 75 | .. | .. | .. |
| Detroit Wyandotte Motor Co., Wyandotte, Mich. | | | | | | | | | | | |
| SB O | S | C | S | 3 | 36x5 | 40x4D | L 145 | 66 | .. | .. | .. |
| Four Wheel Drive Auto Co., Clintonville, Wis. | | | | | | | | | | | |
| SB B | S | S | S | 3 | 36x6 | 36x6 | R 124 | 55 | .. | .. | .. |
| Mais Motor Truck Co., Indianapolis, Ind. | | | | | | | | | | | |
| R E | .. | IG | P | 3 | 36x5 | 36x5D | .. | 160 | .. | .. | .. |
| Nelson & Le Moon, Chicago, Ill. | | | | | | | | | | | |
| R B | M | C | S | 3 | .. | .. | R .. | 80 | .. | .. | .. |
| Pacific Metal Products Co., Torrance, Cal. | | | | | | | | | | | |
| SL B | 1/2 | C | S | 3 | 36x5 | 36x5D | R 160 | 65 | .. | .. | .. |
| Packard Motor Car Co., Detroit, Mich. | | | | | | | | | | | |
| SP E | .. | C | P | 3 | 36x4 | 36x5D | R 144 | 85 | .. | .. | .. |
| Sternberg Mfg. Co., Milwaukee, Wis. | | | | | | | | | | | |
| H E | S | C | IC | 3 | 36x5 | 40x4 | R 130 | 65 | .. | .. | .. |
| H E | S | C | IC | 3 | 36x5 | 40x4 | R 160 | 65 | .. | .. | .. |
| Standard Motor Truck Co., Detroit, Mich. | | | | | | | | | | | |
| SB E | S | C | S | 3 | 36x5 | 36x5D | L 144 | 50 | .. | .. | .. |
| Stegeman Motor Car Co., Milwaukee, Wis. | | | | | | | | | | | |
| C E | .. | C | S | 3 | 36x4 | 40x4D | L 155 | 85 | .. | .. | .. |
| Service Motor Car Co., Wabash, Ind. | | | | | | | | | | | |
| SB E | S | B | S | 3 | 36x5 | 40x5D | L 171 | 70 | .. | .. | .. |
| Universal Motor Truck Co., Detroit, Mich. | | | | | | | | | | | |
| GA E | S | C | S | 3 | 36x5 | 36x4D | .. | 132 | 64 | .. | .. |
| GA E | S | C | S | 3 | 36x5 | 36x4D | .. | 150 | 64 | .. | .. |
| Velle Motor Vehicle Co., Moline, Ill. | | | | | | | | | | | |
| SB B | S | C | S | 3 | 36x5 | 40x5D | R 148 | 80 | .. | .. | .. |
| SB B | S | C | S | 3 | 36x5 | 40x5D | R 172 | 80 | .. | .. | .. |
| Wasatch Motor Mfg. Co., Salt Lake City, Utah. | | | | | | | | | | | |
| SB B | S | C | S | 3 | 36x6 | 40x6D | L 172 | 65 | E | .. | .. |



AVERY MODEL B, 6000-LB. COVERED PLATFORM, CHASSIS, \$3200.

STANDARD 6000-LB. STAKE BODY, \$3100.
Made by Standard Motor Truck Co., Detroit, Mich.
Carrying space, 144x72 in.

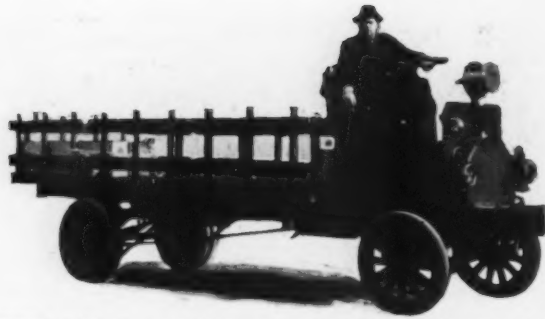
SERVICE MODEL H, 6000-LB. STAKE BODY, CHASSIS, \$2975.

STANDARD 6000-LB. STAKE BODY, \$3100.
Made by Standard Motor Truck Co., Detroit, Mich.
Carrying space, 144x72 in. This chassis also fitted with panel body, 144x72 in., \$3300; flare board, 144x72 in., \$3100; dumping body, 82 cu. ft., \$3500; oil tank, 1000 gal., \$3250.

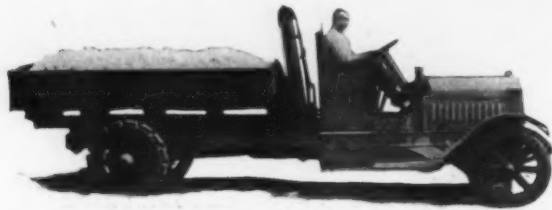
NELSON & LE MOON MODEL D-3, 6000-LB. ICE BODY, CHASSIS, \$2750.



STEGEMAN 6000-LB. CANOPY TOP, CHASSIS, \$3500.



LEWIS MODEL 215, 6000-LB. STAKE BODY, CHASSIS, \$3500.



SMITH-MILWAUKEE 7000-LB. DUMPING BODY, CHASSIS, \$3750.

Made by A. O. Smith Co.



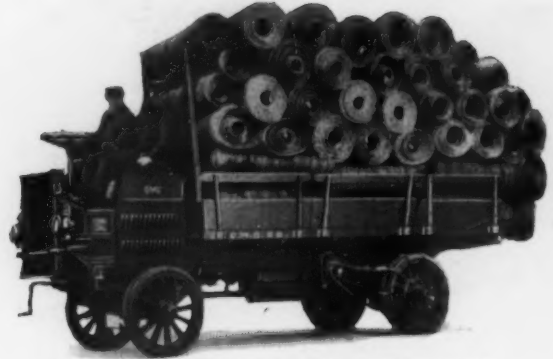
STERNBERG 8000-LB. STAKE BODY, CHASSIS, \$4000.



MOGUL MODEL O, 8000-LB. FLARE BOARD.



HENDRICKSON 8000-LB. STAKE BODY, CHASSIS, \$3400.

GMC MODEL H, 7000-LB. STAKE BODY, \$2250.
Made by General Motors Truck Co.

6000 Pound Gasoline

| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P'fm | Maximum Speed | Horse Power | Cylinders | Bore | Stroke | Cylinders Cast | Cooling | Radiator |
|-------|----------------|---------------|------------------------------|------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|
|-------|----------------|---------------|------------------------------|------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|

| | | | | | | | | | | | | | |
|-------|------|------|--------|----|----|----|------|------|---|--|---|---|---|
| 218 | 6200 | 3500 | 36x162 | 38 | 15 | 29 | 4 | 4.25 | 5 | | P | C | H |
| ..... | 6000 | 3400 | ..... | 14 | 36 | 4 | 4.75 | 5 | | | P | C | V |
| ..... | 6000 | 3650 | ..... | 14 | 36 | 4 | 4.75 | 5 | | | P | C | V |

7000 Pound Gasoline

| | | | | | | | | | | | | | |
|--|-------|------|-------|-------|----|-------|-------|-------|-------|--|---|---|----|
| General Motors Truck Co., Pontiac, Mich. | | | | | | | | | | | | | |
| H | ..... | 2250 | ..... | 10 | 40 | 4 | 5 | 5 | | | P | W | .. |
| HU | ..... | 2500 | ..... | 10 | 40 | 4 | 5 | 5 | | | P | W | .. |
| Kissel Motor Car Co., Hartford, Wis. | | | | | | | | | | | | | |
| .... | 7300 | 3350 | ..... | 51 | 12 | 38 | 4 | 4.88 | 5 | | P | C | T |
| Robinson Motor Truck Co., Minneapolis, Minn. | | | | | | | | | | | | | |
| G | ..... | 3400 | 150 | ..... | 4 | ..... | ..... | ..... | ..... |  | P | W | .. |
| A. O. Smith Co., Milwaukee, Wis. | | | | | | | | | | | | | |
| .... | ..... | 3750 | ..... | 40 | 4 | 5 | 5.75 | | | | W | V | |
| Wichita Falls Motor Co., Wichita Falls, Tex. | | | | | | | | | | | | | |
| H | 6100 | 3250 | ..... | 36 | 29 | 4 | 4.25 | 5.75 | | | P | C | H |

8000 Pound Gasoline

| | | | | | | | | | | | | | |
|---|------|------|-------|----|----|----|-----|------|------|--|---|---|---|
| Hendrickson Motor Truck Co., Chicago, Ill. | | | | | | | | | | | | | |
| 4-ton | 7000 | 3400 | ..... | 47 | 12 | 29 | 4 | 4.25 | 5.75 | | P | C | H |
| Old Reliable Motor Truck Co., Chicago, Ill. | | | | | | | | | | | | | |
| ..... | 7100 | 4000 | ..... | 43 | 12 | 36 | 4 | 4.75 | 5.5 | | P | C | C |
| Packard Motor Car Co., Detroit, Mich. | | | | | | | | | | | | | |
| ..... | 6760 | 2550 | ..... | 43 | 12 | 32 | 4 | 4.5 | 5.5 | | P | C | H |
| Sternberg Mfg. Co., Milwaukee, Wis. | | | | | | | | | | | | | |
| ..... | 7300 | 4000 | ..... | 47 | 10 | 32 | 4 | 4.5 | 6.75 | | P | C | V |
| Stegeman Motor Car Co., Milwaukee, Wis. | | | | | | | | | | | | | |
| ..... | 6000 | 3950 | ..... | 10 | 32 | 4 | 4.5 | 5.5 | | | P | C | T |

10,000 Pound Gasoline

| | | | | | | | | | | | | | |
|--|-------|------|-------|----|----|------|------|------|---|--|---|---|---|
| Avery Co., Peoria, Ill. | | | | | | | | | | | | | |
| B | 7750 | 4500 | ..... | 44 | 4 | 5.25 | 5.75 | | | | P | C | C |
| Couple Gear Freight Wheel Co., Grand Rapids, Mich. | | | | | | | | | | | | | |
| AC | 11000 | 5400 | ..... | 44 | 10 | 53 | 4 | 5.75 | 6 | | S | W | H |



COUPLE GEAR MODEL AC, 10,000-LB. GAS ELECTRIC COAL BODY, \$5600.



MORELAND 8000-LB. DUMPING BODY.
Made by Moreland Motor Truck Co., Los Angeles, Cal.



HARDER 6000-LB. FURNITURE VAN, CHASSIS, \$3400.
This chassis also made with motor under the hood, \$3650.

Commercial Cars

| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|------------|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
|------------|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|

| | | | | | | | | | | | |
|---|----|----|---|----|---|------|-------|---|-----|----|----|
| R | B | S | C | IC | 3 | 34x4 | 34x6D | R | 144 | 65 | .. |
| O | .. | .. | C | ZZ | 3 | .. | .. | R | 140 | .. | .. |
| O | .. | .. | C | ZZ | 3 | .. | .. | R | 140 | .. | .. |

Lewis Motor Truck Co., San Francisco, Cal.

Harder Auto Truck Co., Chicago, Ill.

Commercial Cars

| | | | | | | | | | | | |
|----|----|----|---|---|---|------|-------|----|-----|----|----|
| H | M | .. | C | P | 3 | 36x5 | 36x4D | R | 138 | .. | .. |
| H | M | .. | C | P | 3 | 36x5 | 36x4D | R | 138 | .. | .. |
| SB | B | S | C | S | 4 | .. | D | L | 162 | 80 | .. |
| .. | .. | .. | C | P | 3 | 36x5 | 36x5 | .. | 138 | .. | .. |
| SB | E | .. | W | S | 3 | 36x5 | 36x5D | .. | 168 | .. | .. |
| C | B | .. | C | S | 3 | 36x5 | 36x5D | L | 162 | 75 | .. |

General Motors Truck Co., Pontiac, Mich.

Kissel Motor Car Co., Hartford, Wis.

Robinson Motor Truck Co., Minneapolis, Minn.

A. O. Smith Co., Milwaukee, Wis.

Wichita Falls Motor Co., Wichita Falls, Tex.

Commercial Cars

| | | | | | | | | | | | |
|----|---|-----|---|----|---|------|-------|---|-----|----|----|
| SB | B | S | C | S | 4 | 38x5 | 38x5D | R | 138 | 75 | .. |
| SB | B | 1/2 | C | S | 3 | 36x5 | 36x5D | R | 126 | .. | .. |
| SP | E | .. | C | P | 3 | 36x5 | 34x5D | R | 144 | 85 | .. |
| H | E | S | C | IC | 3 | 36x5 | 40x5D | R | 144 | 65 | .. |
| C | E | .. | C | S | 3 | 36x5 | 40x5D | L | 155 | 85 | .. |

Hendrickson Motor Truck Co., Chicago, Ill.

Old Reliable Motor Truck Co., Chicago, Ill.

Packard Motor Car Co., Detroit, Mich.

Sternberg Mfg. Co., Milwaukee, Wis.

Stegeman Motor Car Co., Milwaukee, Wis.

Commercial Cars

| | | | | | | | | | | | |
|----|---|-----|----|----|----|-------|-------|---|-----|----|----|
| SL | E | .. | C | S | 3 | 36x6 | 38x5D | R | 140 | .. | .. |
| SB | M | 1/2 | IG | .. | .. | 36x5D | 36x5D | R | 144 | 50 | .. |

Avery Co., Peoria, Ill.

Couple Gear Freight Wheel Co., Grand Rapids, Mich.



COUPLE GEAR MODEL AC, 10,000-LB. GAS ELECTRIC STAKE BODY, \$5600.

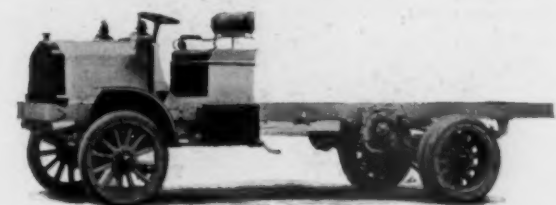


SMITH-MILWAUKEE 7000-LB. FURNITURE VAN, CHASSIS, \$3750.

Made by A. O. Smith Co.



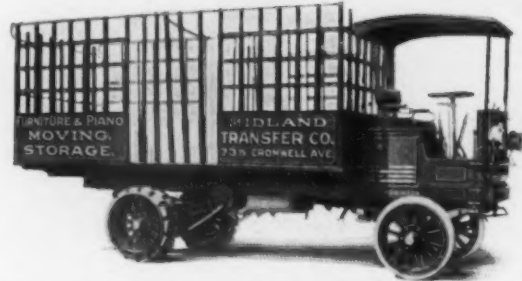
OLD RELIABLE 8000-LB. FLARE BOARD, CHASSIS, \$4000.



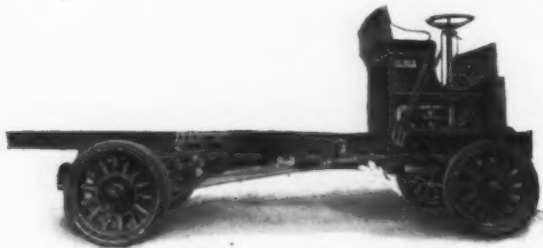
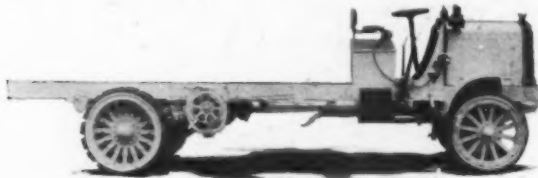
PACKARD 8000-LB. CHASSIS, \$3550.



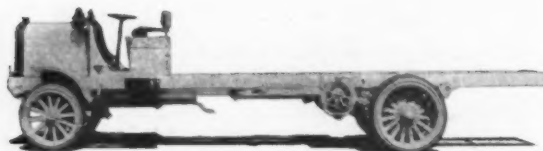
LEWIS 10,000-LB. STAKE PLATFORM BODY.



ROBINSON MODEL H, 10,000-LB. STAKE BODY, CHASSIS, \$3800.

LEWIS MODEL 51, 10,000-LB. CHASSIS, \$4750.
Carrying space, 160x42 in.

PACKARD 10,000-LB. CHASSIS, \$4500.



PACKARD 12,000-LB. CHASSIS, \$4650.



STERNBERG 12,000-LB. COVERED PLATFORM BODY, CHASSIS, \$4750.

10,000 Pound Gasoline

| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P't'm | Maximum Speed | Horse Power | Cylinders | Bore | Stroke | Cylinders Cast | Cooling | Radiator |
|---|----------------|---------------|------------------------------|-------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|
| Detroit Wyandotte Motor Co., Wyandotte, Mich. | | | | | | | | | | | | |
| 5 | 8520 | 4200 | 50 | 10 | 44 | 4 | 5.25 | 5.75 | P | C | T | |
| General Motors Truck Co., Pontiac, Mich. | | | | | | | | | | | | |
| K | 2750 | | | | 40 | 4 | 5 | 5 | P | W | | |
| KU | 3000 | | | | 40 | 4 | 5 | 5 | P | W | | |
| KD | 2750 | | | | 40 | 4 | 5 | 5 | P | W | | |
| Four Wheel Drive Auto Co., Clintonville, Wis. | | | | | | | | | | | | |
| | 8500 | 4800 | 10 | 44 | 4 | 5.25 | 7 | | P | C | H | |
| Old Reliable Motor Truck Co., Chicago, Ill. | | | | | | | | | | | | |
| | 7200 | 4500 | 43 | 12 | 36 | 4 | 4.75 | 5.5 | P | C | C | |
| Pacific Metal Products Co., Torrance, Cal. | | | | | | | | | | | | |
| G | 10000 | 4500 | 32 | 10 | 44 | 4 | 5.25 | 7 | P | C | V | |
| Packard Motor Car Co., Detroit, Mich. | | | | | | | | | | | | |
| | 8560 | 4500 | 42 | 10 | 40 | 4 | 5 | 5.5 | P | C | H | |
| Robinson Motor Truck Co., Minneapolis, Minn. | | | | | | | | | | | | |
| H | | 3800 | 162 | | | | | | P | W | | |
| Sternberg Mfg. Co., Milwaukee, Wis. | | | | | | | | | | | | |
| | 8975 | 4500 | 50 | 10 | 32 | 4 | 4.5 | 6.75 | P | C | V | |
| Stegeman Motor Car Co., Milwaukee, Wis. | | | | | | | | | | | | |
| | 6400 | 4200 | 8 | 40 | 4 | 5 | 5.75 | | P | C | T | |
| Universal Motor Truck Co., Detroit, Mich. | | | | | | | | | | | | |
| K | 5600 | 4200 | 43 | 10 | 40 | 4 | 5 | 5.75 | P | C | H | |
| K | 5600 | 4200 | 43 | 10 | 40 | 4 | 5 | 5.75 | P | C | H | |
| Lewis Motor Truck Co., San Francisco, Cal. | | | | | | | | | | | | |
| 51 | 8000 | 4750 | 42x160 | 41 | 12 | 36 | 4 | 4.75 | 5.5 | P | C | H |
| Harder Auto Truck Co., Chicago, Ill. | | | | | | | | | | | | |
| | 8000 | 4400 | | 10 | 40 | 4 | 5 | 6 | P | C | V | |

12,000 Pound Gasoline

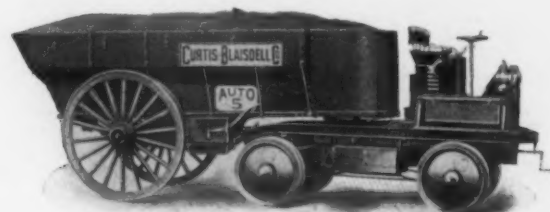
| | | | | | | | | | | | | |
|---------------------------------------|------|------|----|----|----|---|------|------|---|---|---|--|
| Kissel Motor Car Co., Hartford, Wis. | | | | | | | | | | | | |
| | 7900 | 4350 | 51 | 11 | 38 | 4 | 4.88 | 5 | P | C | T | |
| Mogul Motor Truck Co., St. Louis, Mo. | | | | | | | | | | | | |
| M | 9000 | 4600 | 42 | 12 | 44 | 4 | 5.25 | 5.75 | P | C | C | |
| Packard Motor Car Co., Detroit, Mich. | | | | | | | | | | | | |
| | 9337 | 4650 | 43 | 8 | 40 | 4 | 5 | 5.5 | P | C | H | |
| Sternberg Mfg. Co., Milwaukee, Wis. | | | | | | | | | | | | |
| | 9175 | 4750 | 50 | 10 | 36 | 4 | 4.75 | 6.75 | P | C | V | |

14,000 Pound Gasoline

| | | | | | | | | | | | | |
|-------------------------------------|------|------|----|---|----|---|------|------|---|---|---|--|
| Sternberg Mfg. Co., Milwaukee, Wis. | | | | | | | | | | | | |
| | 9325 | 5000 | 50 | 9 | 36 | 4 | 4.75 | 6.75 | P | C | V | |

20,000 Pound Gasoline

| | | | | | | | | | | | | |
|--|-------|------|----|---|----|---|------|---|---|---|---|--|
| Couple Gear Freight Wheel Co., Grand Rapids, Mich. | | | | | | | | | | | | |
| AC | 10000 | 5550 | 48 | 8 | 53 | 4 | 5.75 | 6 | S | W | H | |



COUPLE GEAR, 20,000-LB. GAS ELECTRIC SEMI-TRACTOR, TRACTOR ONLY, \$5550.



MORELAND 10,000-LB. STAKE BODY.
Made by Moreland Motor Truck Co., Los Angeles, Cal.

Commercial Cars

| | Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|---|------------|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
| SB O | S | C | S 3 | 38x6 | 32x6D | L 156 | 66 | .. | .. | .. | .. | .. |
| Detroit Wyandotte Motor Co., Wyandotte, Mich. | | | | | | | | | | | | |
| H M | C | P | 36x6 | 36x5D | R 138 | .. | .. | .. | .. | .. | .. | .. |
| H M | C | P | 36x6 | 42x6D | L 156 | .. | .. | .. | .. | .. | .. | .. |
| H M | C | P | 36x6 | 36x5D | R 138 | .. | .. | .. | .. | .. | .. | .. |
| General Motors Truck Co., Pontiac, Mich. | | | | | | | | | | | | |
| SP D | S | S 3 | 38x5D | 38x5D | R 148 | 55 | .. | .. | .. | .. | .. | .. |
| Four Wheel Drive Auto Co., Clintonville, Wis. | | | | | | | | | | | | |
| SB B | C | S 3 | 36x6 | 36x6D | R 126 | .. | .. | .. | .. | .. | .. | .. |
| Old Reliable Motor Truck Co., Chicago, Ill. | | | | | | | | | | | | |
| SL B | C | S 4 | 36x6 | 42x6D | R 180 | 65 | .. | .. | .. | .. | .. | .. |
| Pacific Metal Products Co., Torrance, Cal. | | | | | | | | | | | | |
| SP E | C | P 3 | 36x6 | 40x6D | R 144 | 85 | .. | .. | .. | .. | .. | .. |
| Packard Motor Car Co., Detroit, Mich. | | | | | | | | | | | | |
| .. | C | P 3 | 36x6 | 36x6D | .. 144 | .. | .. | .. | .. | .. | .. | .. |
| Robinson Motor Truck Co., Minneapolis, Minn. | | | | | | | | | | | | |
| H E | S | C IC 3 | 38x6 | 42x6D | R 144 | 65 | .. | .. | .. | .. | .. | .. |
| Sternberg Mfg. Co., Milwaukee, Wis. | | | | | | | | | | | | |
| C E | C | S 3 | 36x6 | 40x6D | L 168 | 85 | .. | .. | .. | .. | .. | .. |
| Stegeman Motor Car Co., Milwaukee, Wis. | | | | | | | | | | | | |
| SL M | C | S 3 | 36x6 | 36x5D | .. 136 | 64 | .. | .. | .. | .. | .. | .. |
| SL M | C | S 3 | 36x6 | 36x5D | .. 156 | 64 | .. | .. | .. | .. | .. | .. |
| Universal Motor Truck Co., Detroit, Mich. | | | | | | | | | | | | |
| R B | S | C IC 3 | 36x5 | 38x6D | R 144 | 65 | .. | .. | .. | .. | .. | .. |
| Lewis Motor Truck Co., San Francisco, Cal. | | | | | | | | | | | | |
| O | C | S 3 | ..... | ..... | R 140 | .. | .. | .. | .. | .. | .. | .. |
| Harder Auto Truck Co., Chicago, Ill. | | | | | | | | | | | | |

Commercial Cars

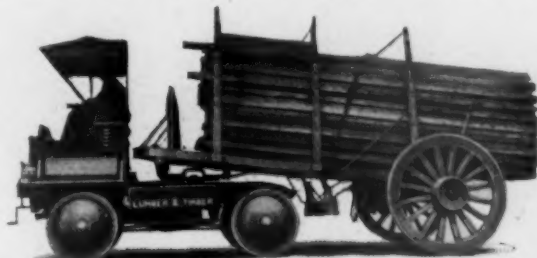
| | | | | | | | | | | | | |
|---------------------------------------|---|--------|-------|-------|-------|----|----|----|----|----|----|----|
| SB B | S | C S 4 | ..... | D | L 168 | 85 | .. | .. | .. | .. | .. | .. |
| Kissel Motor Car Co., Hartford, Wis. | | | | | | | | | | | | |
| SB M | C | P 3 | 36x7 | 40x7D | R 155 | 60 | .. | .. | .. | .. | .. | .. |
| Mogul Motor Truck Co., St. Louis, Mo. | | | | | | | | | | | | |
| SP E | C | P 3 | 36x6 | 42x7D | R 144 | 85 | .. | .. | .. | .. | .. | .. |
| Packard Motor Car Co., Detroit, Mich. | | | | | | | | | | | | |
| H E | S | C IC 3 | 38x6 | 42x6D | R 144 | 65 | .. | .. | .. | .. | .. | .. |
| Sternberg Mfg. Co., Milwaukee, Wis. | | | | | | | | | | | | |

Commercial Cars

| | | | | | | | | | | | | |
|-------------------------------------|---|--------|------|-------|-------|----|----|----|----|----|----|----|
| H E | S | C IC 3 | 38x7 | 42x7D | R 147 | 65 | .. | .. | .. | .. | .. | .. |
| Sternberg Mfg. Co., Milwaukee, Wis. | | | | | | | | | | | | |

Commercial Cars

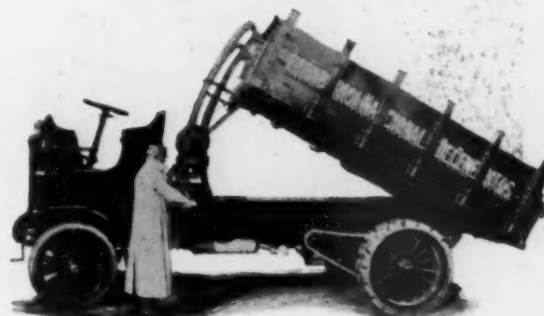
| | | | | | | | | | | | | |
|--|----|-------|-------|-------|-------|----|----|----|----|----|----|----|
| SB M | IG | ..... | 36x5D | 36x5D | R 104 | 30 | .. | .. | .. | .. | .. | .. |
| Couple Gear Freight Wheel Co., Grand Rapids, Mich. | | | | | | | | | | | | |



COUPLE GEAR, 20,000-LB. GAS ELECTRIC SEMI-TRACTOR,
TRACTOR ONLY, \$5550.



OLD RELIABLE 10,000-LB. SLAT SIDE STAKE BODY,
CHASSIS, \$4500.



STERNBERG 10,000-LB. DUMPING BODY, CHASSIS, \$4900.



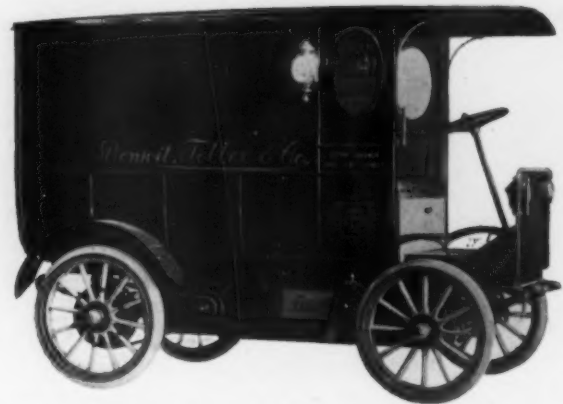
MOGUL, MODEL M, 12,000-LB. STAKE PLATFORM, CHASSIS,
\$4600.



STERNBERG 14,000-LB. SLAT SIDE PLATFORM, CHASSIS,
\$5000.



VAN AUKEN MODEL A, 750-LB. STAKE BODY, \$1000.
This chassis also fitted with panel body, 56x41x53 in., \$1000; flare board, \$1000.



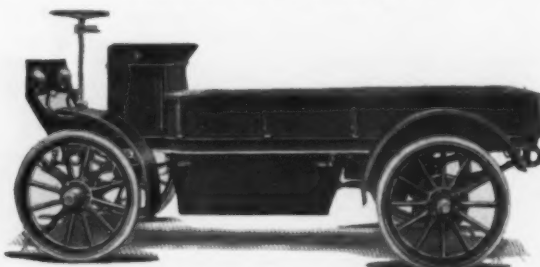
DETROIT MODEL 1, 1000-LB. PANEL BODY, \$2225.
Made by Anderson Electric Car Co.
This chassis also fitted with stake body, 72x48 in., \$2000; flare board, \$2150.



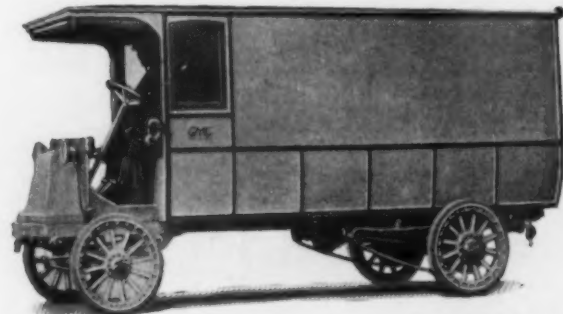
FRITCHLE 1000-LB. PANEL BODY, \$2000.
This chassis also fitted with stake body, \$1950; flare board, \$1950.



WAVERLY 1000-LB. PANEL BODY, \$2100 (WITHOUT BATTERY).
Carrying space, 43x73x56 in. This chassis also fitted with stake body, \$2000; flare board, \$2000.



ARGO MODEL K-20, 2000-LB. FLARE BOARD, \$2150.
This chassis also fitted with stake body.



GMC MODEL 2, 2000-LB. PANEL BODY, CHASSIS, \$1300.
Made by General Motors Truck Co.

750 Pound Electric

| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P't'n | Maximum Speed | Mileage per Charge | Motor | Battery |
|-------|----------------|---------------|------------------------------|-------------------|---------------|--------------------|-------|---------|
|-------|----------------|---------------|------------------------------|-------------------|---------------|--------------------|-------|---------|

Van Auker Electric Car Company, Chicago, Ill.
A 1380 1000 56x41x53 28 12 40 SS EX

1000 Pound Electric

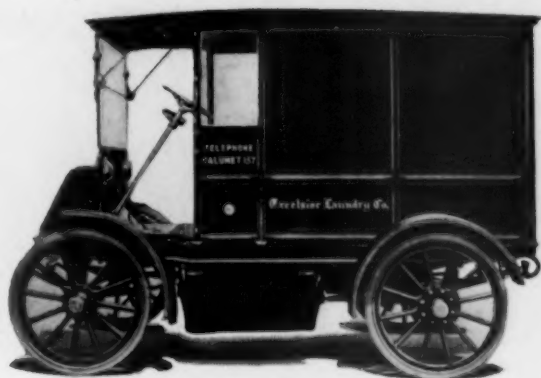
| | | | | | | | | |
|-------|------|------|----------|----|-------|-------|-------|-------|
| 1 | 2600 | 1800 | 48x72 | 33 | 14 | 50 | SS | O |
| K-10 | 2700 | 1750 | ..... | 32 | 16 | 50 | SS | EX |
| L-10 | 2700 | 1850 | 42x68 | 32 | 15 | 50 | SS | EX |
| ..... | 1800 | 1800 | ..... | 12 | 60 | SS | G | |
| ..... | 2000 | 1900 | ..... | 14 | 100 | ..... | ..... | ..... |
| 1 | 2540 | 1200 | ..... | 13 | ..... | SS | O | |
| ..... | 3250 | 1525 | 43x73x56 | 33 | 14 | 50 | SS | O |

1500 Pound Electric

| | | | | | | | | |
|-------|-------|-------|-------|----|----|-------|----|----|
| ..... | ..... | *2100 | 45x74 | 40 | 15 | 50 | SS | EX |
| ..... | ..... | 1450 | ..... | 14 | 50 | ..... | G | |

2000 Pound Electric

| | | | | | | | | |
|-------|------|------|-------|----|-------|----|----|----|
| 12 | 3850 | 2050 | 48x96 | 34 | 12 | 50 | SS | O |
| K-20 | 3000 | 2000 | ..... | 32 | 13 | 50 | SS | EX |
| ..... | 2500 | 2250 | ..... | 12 | 50 | SS | G | |
| 2 | 2780 | 1300 | ..... | 11 | ..... | SS | O | |



ARGO MODEL L-10, 1000-LB. PANEL BODY, \$2150.
Carrying space, 68x42x54 in.



WALKER BALANCE DRIVE MODEL F, 1000-LB. PANEL BODY.

Commercial Cars

| Battery Capacity | Controller | Speeds Forward | Drive | Rear Axle | Front Tires | Rear Tires | Steering & Control | % Weight on Rear Wheels | Wheelbase |
|------------------|------------|----------------|-------|-----------|-------------|------------|--------------------|-------------------------|-----------|
|------------------|------------|----------------|-------|-----------|-------------|------------|--------------------|-------------------------|-----------|

138 C 4 S .. 28x2 28x2 L 63 80
Van Auken Electric Car Company, Chicago, Ill.

Commercial Cars

150 C 4 B S 32x3 34x3 L 65 100
Anderson Electric Car Company, Detroit, Mich.
Argo Electric Vehicle Co., Saginaw, Mich.
... C 5 B F 34x3 34x3 L 60 86
... C 5 B F 34x3 34x3 L 60 86
Capitol Truck Manufacturing Company, Denver, Colo.
... C 4 W F D 60 108
Fritchle Auto & Battery Company, Denver, Colo.
... 4 B F *34x4 *34x4 .. 40 88
General Motors Truck Co., Pontiac, Mich.
... 5 C D 32x2½ 32x3½ L .. 106
Waverley Company, Indianapolis, Ind.
135 K 4 S F 34x2½ 34x2½ L .. 90

Commercial Cars

GE 5 C D 32x4 32x4 L .. 96
Borland-Grannis Company, Chicago, Ill.
M. & P. Electric Vehicle Company, Detroit, Mich.
... 4 C L .. 100

Commercial Cars

225 C 4 B S 32x3½ 34x3½ L 63 109
Anderson Electric Car Company, Detroit, Mich.
Argo Electric Vehicle Company, Saginaw, Mich.
... C 5 B F 34x3½ 34x3½ L 60 96
Capitol Truck Manufacturing Company, Denver, Colo.
... C 4 W F D 60 114
General Motors Truck Company, Pontiac, Mich.
... 5 C D 32x2½ 32x3½ L .. 106



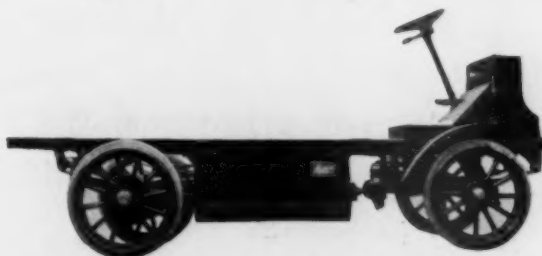
WALKER BALANCE DRIVE MODEL G, 1000-LB. EMERGENCY WAGON.



ARGO MODEL K-10, 1000-LB. STAKE BODY, \$1900.
This chassis also fitted with flare board, \$1900.



CAPITOL 2000-LB. FLARE BOARD, CHASSIS, \$2250.
This chassis also fitted with panel body, \$2400; stake body, \$2300.



DETROIT MODEL 2, 2000-LB. CHASSIS, \$2050.
Made by Anderson Electric Car Co.
This chassis fitted with panel body, \$2500; stake body, 96x48 in., \$2300; flare board, \$2400.



WALKER BALANCE DRIVE MODEL C, 2000-LB. PANEL BODY.

DETROIT 3000-LB. CANOPY TOP BODY.
Made by Anderson Electric Car Co.**2000 Pound Electric**

| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P'ft'm | Maximum Speed | Mileage per Charge | Motor | Battery |
|-------|----------------|---------------|------------------------------|--------------------|---------------|--------------------|-------|---------|
|-------|----------------|---------------|------------------------------|--------------------|---------------|--------------------|-------|---------|

..... 4570 1850 44x102x60 40 11 45 SS O
Waverley Company, Indianapolis, Ind.

3000 Pound Electric

3 3040 1450 10 .. SS O
General Motors Truck Company, Pontiac, Mich.

4000 Pound Electric

4 6300 2800 60x132 38 10 50 SS O
Anderson Electric Car Company, Detroit, Mich.

..... 3000 3000 12 50 SS G
Capitol Truck Manufacturing Company, Denver, Colo.

4 4005 1650 9 .. SS O
General Motors Truck Company, Pontiac, Mich.

..... 6370 54x132x72 41 9 O
Waverley Company, Indianapolis, Ind.

6000 Pound Electric

6 4765 1900 8 .. SS O
General Motors Truck Company, Pontiac, Mich.

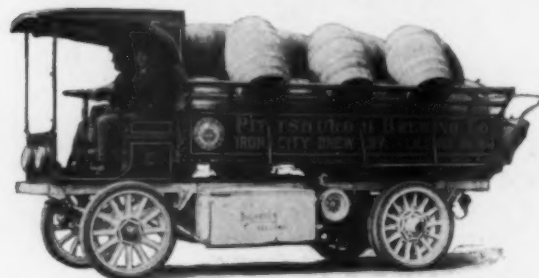
7000 Pound Electric

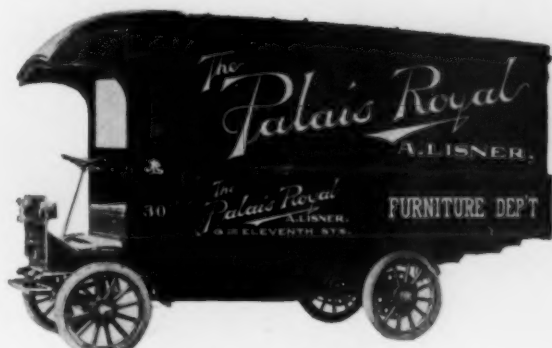
7 8600 3850 60x156 40 8 45 SS O
Anderson Electric Car Company, Detroit, Mich.

HS 9000 4250 44 10 40 SS U
Couple Gear Freight Wheel Co., Grand Rapids, Mich.

DETROIT 3000-LB. COVERED AND SIDED STAKE BODY.
Made by Anderson Electric Car Co.DETROIT 3000-LB. COVERED STAKE BODY.
Made by Anderson Electric Car Co.

WALKER BALANCE DRIVE, MODEL D, 5000-LB. PANEL BODY.

G. M. C. MODEL 6, 6000-LB. STAKE BODY, CHASSIS, \$1900.
Made by General Motors Truck Co.WAVERLEY 4000-LB. FLARE BOARD.
Carrying space, 54x132 in.



DETROIT 3000-LB. CANOPY TOP BODY.
Made by Anderson Electric Car Co.

Commercial Cars

| Battery Capacity | Controller | Speeds Forward | Drive | Rear Axle | Front Tires | Rear Tires | Steering & Control | % Weight on Rear Wheels | Wheelbase |
|------------------|------------|----------------|-------|-----------|-------------|------------|--------------------|-------------------------|-----------|
|------------------|------------|----------------|-------|-----------|-------------|------------|--------------------|-------------------------|-----------|

184 K 4 C D 34x3 1/2 34x3 1/2 L .. 104
Waverley Company, Indianapolis, Ind.

Commercial Cars

General Motors Truck Company, Pontiac, Mich.
... 5 C D 32x3 L .. 130

Commercial Cars

Anderson Electric Car Company, Detroit, Mich.
300 C 4 C D 36x4 36x3 1/2 D L 71 128

Capitol Truck Manufacturing Company, Denver, Colo.
... C 4 W F D L 60 120

General Motors Truck Company, Pontiac, Mich.
... 5 C D 32x3 32x5 L .. 138

Waverley Company, Indianapolis, Ind.
216 .. 4 .. 36x4 36x3 D .. 114

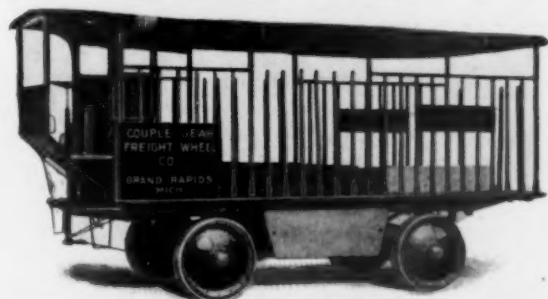
Commercial Cars

General Motors Truck Company, Pontiac, Mich.
... 5 C D 32x3 1/2 36x3 1/2 L .. 150

Commercial Cars

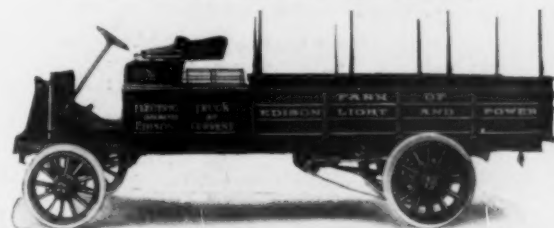
Anderson Electric Car Company, Detroit, Mich.
375 C 4 C D 36x5 36x4 D L 73 144

Couple Gear Freight Wheel Co., Grand Rapids, Mich.
250 C 5 B D 36x4 D 36x4 D R 50 102



COUPLE GEAR MODEL H-8, 7000-LB. COVERED STAKE BODY, \$4425.

This chassis also fitted with panel body, \$4475.

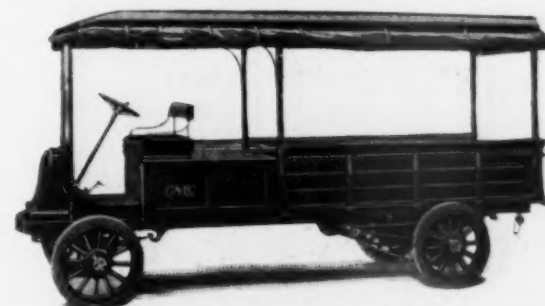


G. M. C. MODEL 4, 4000-LB. FLARE BOARD, CHASSIS, \$1650.
Made by General Motors Truck Co.



WAVERLEY 2000-LB. COVERED FLARE BOARD, \$2350 (WITH-
OUT BATTERY).

This chassis also fitted with panel body, 44x112x60 in., \$2500;
stake body, \$2350.



G. M. C. MODEL 3, 3000-LB. CANOPY TOP, CHASSIS, \$1450.
Made by General Motors Truck Co.

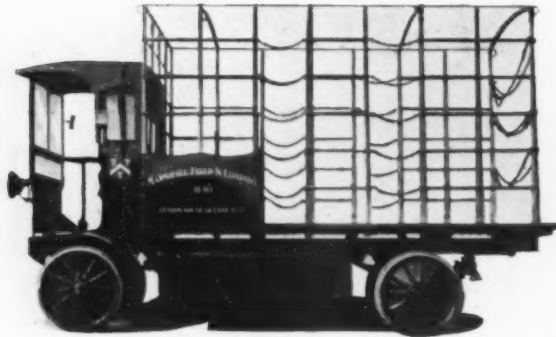


WALKER BALANCE DRIVE MODEL B, 3000-LB. PANEL BODY.

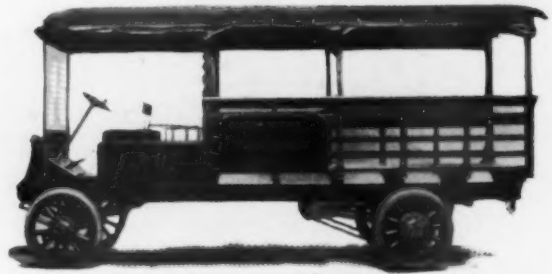


DETROIT MODEL 4, 4000-LB. COVERED STAKE, \$3075.
Made by Anderson Electric Car Co.

Carrying space, 132x60 in. This chassis also fitted with flare
board body, \$3175; panel body.



WALKER BALANCE DRIVE MODEL E, 7000-LB. STAKE BODY.

COUPLE GEAR MODEL A-9, 10,000-LB. STAKE BODY, \$5050.
This chassis also fitted with panel body, \$5100.G. M. C. MODEL 10, 10,000-LB. CANOPY TOP, CHASSIS, \$2350.
Made by General Motors Truck Co.**7000 Pound Electric**

| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P't'm | Maximum Speed | Mileage per Charge | Motor | Battery |
|-------|----------------|---------------|------------------------------|-------------------|---------------|--------------------|-------|---------|
| .... | 8130 | ..... | 60x144x72 | 41 | 8 | .. | ... | O |

8000 Pound Electric

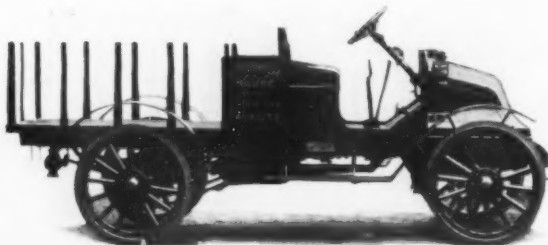
| | | | | | | | | |
|---|------|------|-------|----|---|----|----|---|
| 8 | 5620 | 2100 | | .. | 7 | .. | SS | O |
|---|------|------|-------|----|---|----|----|---|

10,000 Pound Electric

| | | | | | | | | |
|------|-------|------|-----------|----|---|----|----|---|
| 10 | 9300 | 4200 | 60x156 | 40 | 7 | 40 | SS | O |
| A9 | 10000 | 4850 | ..... | 44 | 8 | 35 | SS | U |
| 10 | 6225 | 2350 | ..... | .. | 7 | .. | SS | O |
| .... | 9575 | 3450 | 78x156x72 | 42 | 7 | 30 | SS | O |

12,000 Pound Electric

| | | | | | | | | |
|----|------|------|-------|----|---|----|----|---|
| 12 | 6820 | 2500 | | .. | 6 | .. | SS | O |
|----|------|------|-------|----|---|----|----|---|



PALMER-MOORE MODEL C, 2000-LB. STAKE BODY, \$1275.



PALMER-MOORE MODEL C, 2000-LB. PANEL BODY, \$1350.

EASTERN GASOLINE

(We include here the specifications and material for which was not received in

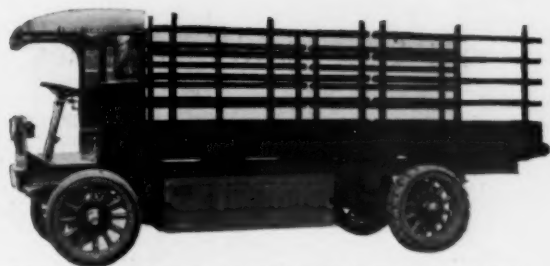
| Model | Chassis Weight | Chassis Price | Dimensions of Carrying Space | Height Load P't'm | Maximum Speed | Horse Power | Cylinders | Bore | Stroke | Cylinders Cast | Cooling | Radiator |
|-------|----------------|---------------|------------------------------|-------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|
|-------|----------------|---------------|------------------------------|-------------------|---------------|-------------|-----------|------|--------|----------------|---------|----------|

2000 Pound Gasoline

| | | | | | | | | | | | | |
|---|------|------|-------|----|----|-----|---|---|---|---|---|----|
| C | 2200 | 1200 | ..... | 34 | 18 | *32 | 3 | 4 | 4 | S | A | .. |
| D | 2200 | 1350 | ..... | 34 | 18 | *32 | 3 | 4 | 4 | S | T | A |

12,000 Pound Gasoline

| | | | | | | | | | | | | |
|------|------|-------|--------|----|----|----|---|-----|---|---|---|---|
| | 8640 | | 72x168 | 48 | 12 | 48 | 4 | 5.5 | 6 | P | C | C |
|------|------|-------|--------|----|----|----|---|-----|---|---|---|---|



DETROIT MODEL 10, 10,000-LB. STAKE BODY, \$4500.
Made by Anderson Electric Car Co.
Carrying Space, 156x60 in. This chassis also fitted with panel body and flare board body.

Commercial Cars

| Battery Capacity | Controller | Speeds Forward | Drive | Rear Axle | Front Tires | Rear Tires | Steering & Control | % Weight on Rear Wheels | Wheelbase |
|------------------|------------|----------------|-------|-----------|-------------|------------|--------------------|-------------------------|-----------|
| ... | ... | 4 | ... | ... | 36x6 | 36x3 1/2 D | ... | ... | 127 |

Waverley Company, Indianapolis, Ind.

Commercial Cars

| | | | | | | | | | |
|-----|-----|---|---|---|------|------|---|-----|-----|
| ... | ... | 5 | C | D | 32x4 | 36x4 | L | ... | 156 |
|-----|-----|---|---|---|------|------|---|-----|-----|

General Motors Truck Company, Pontiac, Mich.

Commercial Cars

| | | | | | | | | | |
|-----|-----|---|---|---|-------|-------|---|-----|-----|
| 450 | C | 4 | C | D | 36x6 | 36x5D | L | 73 | 141 |
| 280 | C | 5 | B | D | 36x5D | 36x5D | R | 50 | 104 |
| ... | ... | 5 | C | D | 36x5 | 36x5 | L | ... | 166 |
| 324 | K | 4 | C | D | 36x7 | 36x5D | L | ... | 136 |

Anderson Electric Car Company, Detroit, Mich.

Couple Gear Freight Wheel Co., Grand Rapids, Mich.

General Motors Truck Company, Pontiac, Mich.

Waverley Company, Indianapolis, Ind.

Commercial Cars

| | | | | | | | | | |
|-----|-----|---|---|---|------|------|---|-----|-----|
| ... | ... | 5 | C | D | 36x6 | 36x6 | L | ... | 192 |
|-----|-----|---|---|---|------|------|---|-----|-----|

General Motors Truck Company, Pontiac, Mich.



WAVERLEY 7000-LB. SCREEN SIDE, CANOPY TOP.
Carrying space, 60x144x72 in.



WAVERLEY 10,000-LB. STAKE BODY.
Carrying space, 78x156x72 in.

COMMERCIAL CARS

illustrations of several Eastern cars, the time for use in our January issue.—Ed.)

| Carburetor | Ignition | Spark Plug Size | Drive | Transmission | Speeds Forward | Front Tires | Rear Tires | Steering & Control | Wheelbase | % Weight on Rear Wheels | Engine Starter |
|------------|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|
|------------|----------|-----------------|-------|--------------|----------------|-------------|------------|--------------------|-----------|-------------------------|----------------|

Commercial Cars

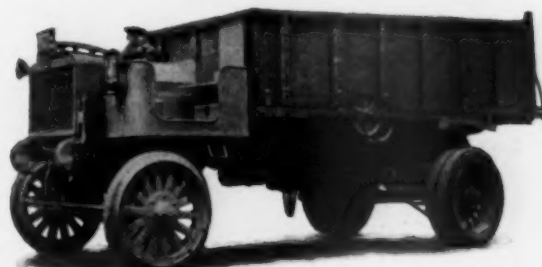
Palmer-Moore Co., Syracuse, N. Y.

| | | | | | | | | | | | |
|----|---|-----|---|---|---|-------|---|---|-----|----|-----|
| SP | B | 1/2 | C | L | 2 | 2 1/2 | 3 | R | 102 | 65 | ... |
| SP | B | 1/2 | C | L | 2 | 2 1/2 | 3 | R | 102 | 65 | ... |

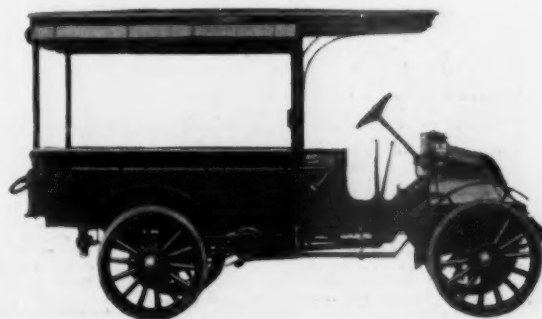
Commercial Cars

American-La France Fire Engine Co., Elmira, N. Y.

| | | | | | | | | | | | |
|----|---|-----|---|---|-----|------|-------|---|-----|-----|-----|
| SL | B | ... | C | H | ... | 36x5 | 38x6D | R | 143 | ... | ... |
|----|---|-----|---|---|-----|------|-------|---|-----|-----|-----|



LA FRANCE 12,000-LB. COAL BODY.
Carrying space, 168x72 in.



PALMER-MOORE MODEL C, 2000-LB. CANOPY TOP, \$1325.

Alphabetical Index of Commercial Car Manufacturers Buyers' Reference Review

| Gasoline Cars | | Page | | | Page | | | Page |
|-----------------------------------|------------------------|------|-------------------------------|------------------------|------|----------------------------------|------------------------|------|
| Alma Motor Truck Co. | 24 | | Harley-Davidson Motor Co. | 16d | | Reo Motor Truck Co. | 32 | |
| Amalgamated Motors Corp. | 30 | | Harvey Motor Truck Works | 26 | | Robinson Motor Truck Co. | 28, 32, 36, 38 | |
| American LaFrance Fire Engine Co. | 44 | | Henderickson Motor Truck Co. | 36 | | Rockford Motor Truck Co. | 20, 32 | |
| Auburn Motor Chassis Co. | 16d, 20 | | Hupp Motor Car Co. | 16d | | Sandow Truck Co. | 28, 32 | |
| Available Truck Co. | 22 | | Ideal Auto Co. | 26, 28, 32 | | Service Motor Car Co. | 28, 32, 34 | |
| Avery Co. | 20, 22, 30, 34, 36 | | International Harvester Corp. | 18 | | Shapiro Michaelson Motor Car Co. | 16d | |
| Beck & Son | 30, 34 | | Thomas B. Jeffery Co. | 20, 24, 26 | | Signal Motor Truck Co. | 22 | |
| Brasie Motor Truck Co. | 30, 34 | | Kalamazoo Motor Vehicle Co. | 26 | | A. O. Smith Co. | 36 | |
| Buckeye Mfg. Co. | 16d, 20, 22, 26, 30 | | Kissel Motor Car Co. | 20, 24, 26, 32, 36, 38 | | South Bend Motor Car Works | 22, 32 | |
| Buick Motor Co. | 16d, 20 | | Kosmath Co. | 20 | | Standard Motor Truck Co. | 34 | |
| Chicago Pneumatic Tool Co. | 22 | | Krit Motor Car Co. | 18 | | Star Motor Car Co. | 24, 28 | |
| Clark Delivery Car Co. | 26 | | Lewis Motor Truck Co. | 20, 28 | | Stegeman Motor Car Co. | 22, 24, 32, 34, 36, 38 | |
| Cleburne Motor Car Mfg. Co. | 18 | | Mais Motor Truck Co. | 32, 36, 38 | | Sternberg Mfg. Co. | 32, 34, 36, 38 | |
| Comet Cyclecar Co. | 16d | | Joseph W. Moon Buggy Co. | 28, 30, 32, 34 | | Studebaker Corp. | 20 | |
| Commerce Motor Car Co. | 16d | | Mason Motor Co. | 18, 22 | | Universal Motor Truck Co. | 28, 34, 38 | |
| Continental Truck Mfg. Co. | 28 | | W. H. McIntyre Co. | 18, 20, 28 | | Veevac Motor Co. | 22 | |
| Couple Gear Freight Wheel Co. | 36, 38 | | Mercury Mfg. Co. | 18 | | Vetie Motor Vehicle Co. | 22 | |
| Crow Motor Car Co. | 18 | | Merz Cyclecar Co. | 16d | | Wade Commercial Car Co. | 16d | |
| Crown Commercial Car Co. | 20, 22, 26, 30, 32, 34 | | Miller Car Co. | 16d | | Wagenhals Motor Co. | 16d | |
| Danielson Engine Works | 26 | | Minneapolis Motor Co. | 16d | | Wayne Works | 22 | |
| Dart Mfg. Co. | 18, 22, 30 | | Mogul Motor Truck Co. | 30, 38 | | Wasatch Motor Mfg. Co. | 18, 24, 34 | |
| DeKalb Wagon Co. | 30 | | Moreland Motor Truck Co. | 18, 28 | | Wichita Falls Motor Co. | 26, 32, 36 | |
| Detroit Wyandotte Motor Co. | 22, 26, 30, 34, 38 | | National Motor Truck Co. | 24 | | H. E. Wilcox Motor Co. | 24, 32, 34 | |
| Diamond T. Motor Car Co. | 26 | | Nelson & Le Moon | 24, 30, 34 | | | | |
| Dispatch Motor Car Co. | 20 | | Nevada Mfg. Co. | 34 | | | | |
| Dorris Motor Co. | 22, 32 | | Nordvick & Marmon Co. | 24 | | | | |
| Duplex Power Co. | 32 | | Old Reliable Motor Truck Co. | 30, 36, 38 | | | | |
| Durant-Dort Carriage Co. | 18, 20 | | O. K. Motor Truck Co. | 18, 24, 30 | | | | |
| F. S. Motors Co. | 18, 24 | | Pacific Metal Products Co. | 30, 34, 38 | | | | |
| Fargo Motor Car Co. | 20, 26 | | Packard Motor Car Co. | 30, 34, 36, 38 | | | | |
| Federal Motor Truck Co. | 26 | | Palmer-Meyer Motor Car Co. | 32 | | | | |
| Four Wheel Drive Auto Co. | 26, 34, 38 | | Palmer-Moore Co. | 44 | | | | |
| S. G. Gay Co. | 22, 26 | | Perfex Co. | 18 | | | | |
| General Motors Truck Co. | 26, 30, 36, 38 | | D. F. Poyer Co. | 20, 24, 28 | | | | |
| Harder Auto Truck Co. | 28, 32, 36, 38 | | Pratt-Carter-Sigsbee & Co. | 18 | | | | |

Electric Cars

| | |
|-------------------------------|------------|
| Anderson Electric Car Co. | 40, 42, 44 |
| Argo Electric Vehicle Co. | 40 |
| Borland-Grannis Co. | 40 |
| Capitol Truck Mfg. Co. | 40, 42 |
| Couple Gear Freight Wheel Co. | 42, 44 |
| Fritchle Auto & Battery Co. | 40, 42, 44 |
| General Motors Truck Co. | 40, 42, 44 |
| M. & P. Electric Vehicle Co. | 40 |
| Van Auker Electric Car Co. | 40 |
| Waverley Co. | 40, 42, 44 |

Gasoline and Electric Commercial Cars Indexed According to Price

| Pr. Cyl. H.P. Body | Maker | Page | Pr. Cyl. H.P. Body | Maker | Page | Pr. Cyl. H.P. Body | Maker | Page |
|-----------------------------------|----------------------------------|------|-----------------------------------|-------------------------------------|------|--------------------|--|------|
| 3000 Pound Commercial Cars | | | | | | | | |
| 375 1 5 Box | Shapiro Michaelson Motor Car Co. | 16d | 1750 Electric, Stake | Argo Electric Vehicle Co. | 40 | 1200 4 23 | Rockford Motor Truck Co. | 20 |
| 385 2 9 Panel | Imp Cyclecar Co. | 16d | 1800 Electric, Capitol | Truck Mfg. Co. | 40 | 1500 4 29 | Panel, Kissel Motor Car Co. | 20 |
| 425 2 10 Box | Shapiro Michaelson Motor Car Co. | 16d | 1800 Electric, Panel | Anderson Electric Car Co. | 40 | 1525 4 33 | Screen Side, Signal Motor Truck Co. | 22 |
| 430 2 10 Box | Comet Cyclecar Co. | 16d | 1850 Electric, Stake | Argo Electric Vehicle Co. | 40 | 1575 4 33 | Panel, Signal Motor Truck Co. | 22 |
| | | | 1900 Electric, Flare Board | Argo Electric Vehicle Co. | 40 | 1600 4 33 | Panel, Stegeman Motor Car Co. | 22 |
| | | | 1900 Electric, Panel | Fritchle Auto & Battery Co. | 40 | 1650 4 33 | Crown Commercial Car Co. | 20 |
| | | | 1950 Electric, Stake | Fritchle Auto & Battery Co. | 40 | 1650 4 37 | Panel, Dorris Motor Co. | 20 |
| | | | 1950 Electric, Flare Board | Fritchle Auto & Battery Co. | 40 | 2000 4 26 | Avery Co. | 20 |
| | | | 2000 Electric, Stake | Waverley Co. | 40 | 2100 4 27 | Dorris Motor Co. | 22 |
| | | | 2000 Electric, Flare Board | Waverley Co. | 40 | 2100 Electric | Borland-Grannis Co. | 40 |
| | | | 2150 Electric, Stake | Anderson Electric Car Co. | 40 | 2100 4 27 | Panel, Dorris Motor Co. | 20 |
| | | | 2150 Electric, Flare Board | Anderson Electric Car Co. | 40 | | | |
| 500 Pound Commercial Cars | | | | | | | | |
| 305 1 5 Box | Minneapolis Motor Co. | 16d | 1250 Pound Commercial Cars | | | | | |
| 425 2 9 Box | Harley-Davidson Motor Co. | 16d | 825 4 23 | Panel, Dispatch Motor Car Co. | 20 | 1000 4 21 | F. S. Motors Co. | 18 |
| 485 2 10 Panel | Merz Cyclecar Co. | 16d | 850 4 23 | Flare Board, Dispatch Motor Car Co. | 20 | 1200 3 32 | Palmer-Moore Co. | 44 |
| | | | 900 4 20 | Kosmath Co. | 20 | 1275 3 32 | Stake, Palmer-Moore Co. | 44 |
| | | | 1125 4 23 | Buckeye Mfg. Co. | 20 | 1300 Electric | Panel, General Motors Truck Co. | 40 |
| | | | | | | 1300 4 27 | Dart Mfg. Co. | 22 |
| | | | | | | 1325 4 33 | Canopy Top, Palmer-Moore Co. | 44 |
| | | | | | | 1350 4 33 | Palmer-Moore Co. | 44 |
| | | | | | | 1350 4 33 | Alma Motor Truck Co. | 24 |
| | | | | | | 1350 4 33 | Flare Board, Dart Mfg. Co. | 22 |
| | | | | | | 1350 4 33 | Panel, Palmer-Moore Co. | 44 |
| | | | | | | 1350 4 33 | Available Truck Co. | 22 |
| | | | | | | 1400 4 26 | Covered Flare Board, Available Truck Co. | 22 |
| | | | | | | 1400 4 26 | D. F. Poyer Co. | 24 |
| | | | | | | 1425 4 23 | Flare Board, Alma Motor Truck Co. | 22 |
| | | | | | | 1425 4 23 | Panel, Alma Motor Truck Co. | 22 |
| | | | | | | 1425 4 23 | Stake, Alma Motor Truck Co. | 22 |
| | | | | | | 1425 4 23 | Stake, Available Truck Co. | 22 |
| | | | | | | 1425 4 23 | Flare Board, Chicago Pneumatic Tool Co. | 22 |
| | | | | | | 1450 4 23 | Stake, Chicago Pneumatic Tool Co. | 22 |
| | | | | | | 1450 4 23 | O. K. Motor Truck Co. | 24 |
| | | | | | | 1475 4 23 | S. G. Gay Co. | 22 |
| | | | | | | 1475 4 23 | Canopy Top, Chicago Pneumatic Tool Co. | 22 |
| | | | | | | 1475 4 23 | Canopy Top, Service Motor Car Co. | 22 |
| | | | | | | 1500 4 26 | Flare Board, D. F. Poyer Co. | 24 |
| | | | | | | 1500 4 26 | Thomas B. Jeffery Co. | 24 |
| | | | | | | 1500 4 26 | Stake, D. F. Poyer Co. | 24 |
| | | | | | | 1500 4 26 | Panel, Available Truck Co. | 22 |
| | | | | | | 1500 4 26 | Star Motor Car Co. | 24 |
| | | | | | | 1500 4 26 | Covered Flare Board, Ideal Auto Co. | 26 |
| | | | | | | 1525 4 26 | Panel, D. F. Poyer Co. | 24 |
| | | | | | | 1525 4 26 | Canopy Top, D. F. Poyer Co. | 24 |
| | | | | | | 1525 4 26 | Panel, Chicago Pneumatic Tool Co. | 22 |
| | | | | | | 1575 4 23 | Stake, S. G. Gay Co. | 22 |
| | | | | | | 1575 4 23 | Flare Board, S. G. Gay Co. | 22 |
| | | | | | | 1575 4 23 | Flare Board, Thomas B. Jeffery Co. | 24 |
| | | | | | | 1575 4 23 | Stake, O. K. Motor Truck Co. | 24 |
| | | | | | | 1600 4 23 | Palmer-Meyer Motor Car Co. | 24 |
| | | | | | | 1600 4 23 | Canopy Top, Palmer-Meyer Motor Car Co. | 24 |
| | | | | | | 1600 4 23 | Sided Stake, O. K. Motor Truck Co. | 24 |
| | | | | | | 1600 4 23 | Flare Board, O. K. Motor Truck Co. | 24 |
| | | | | | | 1650 4 32 | Panel, O. K. Motor Truck Co. | 24 |
| | | | | | | 1650 4 32 | Stake, Thomas B. Jeffery Co. | 24 |
| | | | | | | 1650 4 32 | Panel, Thomas B. Jeffery Co. | 24 |
| | | | | | | 1675 4 23 | Enclosed, Wichita Falls Motor Co. | 26 |
| | | | | | | 1675 4 23 | Stake, S. G. Gay Co. | 22 |
| | | | | | | 1690 4 27 | Avery Co. | 20 |
| | | | | | | 1700 4 27 | Buckeye Mfg. Co. | 22 |

* Indicates Chassis Price.

| Pr. Cyl. H.P. Body | Maker | Page | Pr. Cyl. H.P. Body | Maker | Page | Pr. Cyl. H.P. Body | Maker | Page |
|--|-------|------|--|-------|------|---|-------|------|
| *1750 4 32 Panel, Thomas B. Jeffery Co. | | 24 | 2200 4 27 Stake, Robinson Motor Truck Co. | | 23 | *3100 4 32 Flare Board, Standard Motor Truck Co. | | 34 |
| *1800 4 23 Nelson & LeMoon | | 24 | *2200 4 27 Covered Express, Federal Motor Truck Co. | | 26 | *3100 4 32 Stake, Standard Motor Truck Co. | | 34 |
| *1800 4 27 Covered Flare Board, Nelson & LeMoon | | 24 | *2250 4 26 Harder Auto Truck Co. | | 28 | *3100 4 32 Stake, Standard Motor Truck Co. | | 34 |
| *1800 4 27 Flare Board, Buckeye Mfg. Co. | | 22 | *2250 4 27 Detroit Wyandotte Motor Co. | | 34 | *3200 4 36 Covered Platform, Avery Co. | | 34 |
| *1800 4 27 Panel, Buckeye Mfg. Co. | | 22 | *2250 4 27 Flare Board, Diamond T Motor Car Co. | | 26 | *3200 4 32 Detroit Wyandotte Motor Co. | | 34 |
| *1800 4 27 Stake, Buckeye Mfg. Co. | | 22 | *2300 4 29 Crown Commercial Car Co. | | 26 | *3200 4 36 Sided Platform, Universal Motor Truck Co. | | 34 |
| *1850 Electric, Flare Board, Waverley Co. | | 22 | *2300 4 27 W. H. McIntyre Co. | | 26 | *3250 4 32 Oil Tank, Standard Motor Truck Co. | | 34 |
| *1850 4 32 Stake, Kissel Motor Car Co. | | 24 | *2350 4 28 Harder Auto Truck Co. | | 28 | *3250 4 29 H. E. Wilcox Motor Co. | | 34 |
| *1925 4 20 National Motor Truck Co. | | 24 | *2750 4 38 Mals Motor Truck Co. | | 28 | *3250 4 32 Panel, Standard Motor Truck Co. | | 34 |
| *1925 4 20 Covered Flare Board, National Motor Truck Co. | | 24 | *2800 4 36 Panel, Mals Motor Truck Co. | | 28 | *3350 4 32 Velle Motor Vehicle Co. | | 34 |
| *2000 4 23 Wasatch Motor Mfg. Co. | | 24 | *3000 4 23 Quadruple Drive Army Wagon, Thomas B. Jeffery Co. | | 26 | *3400 4 26 Mals Motor Truck Co. | | 34 |
| *2000 4 29 H. E. Wilcox Motor Co. | | 24 | *3000 4 29 Stake, Four-Wheel Drive Auto Co. | | 26 | *3400 4 36 Furniture Van, Harder Auto Truck Co. | | 34 |
| *2000 4 23 Stake Side, Clark Delivery Car Co. | | 24 | | | | *3400 4 29 Platform, Sternberg Mfg. Co. | | 34 |
| *2000 Electric, Flare Board, Argo Electric Vehicle Co. | | 26 | | | | *3400 4 32 Standard Motor Truck Co. | | 34 |
| *2000 4 33 Velle Motor Vehicle Co. | | 24 | | | | *3400 4 32 Packard Motor Car Co. | | 34 |
| *2000 4 27 Detroit Wyandotte Motor Co. | | 22 | | | | *3500 4 29 Crown Commercial Car Co. | | 34 |
| *2020 Electric, Anderson Electric Vehicle Co. | | 40 | | | | *3500 4 32 Dumping, Standard Motor Truck Co. | | 34 |
| *2150 4 23 Open Express, Velle Motor Vehicle Co. | | 24 | 1350 2 39 Brastie Motor Truck Co. | | 30 | *3500 4 32 Stake, Velle Motor Vehicle Co. | | 34 |
| *2150 4 33 Stake, Velle Motor Vehicle Co. | | 24 | *1450 2 29 Flare Board, Brastie Motor Truck Co. | | 30 | *3500 4 27 Wasatch Motor Mfg. Co. | | 34 |
| *2250 Electric, Flare Board, Capitol Truck Mfg. Co. | | 40 | *1450 2 29 Stake, Brastie Motor Truck Co. | | 30 | *3500 4 29 Stake, Lewis Motor Truck Co. | | 36 |
| *2250 4 23 Stegeman Motor Car Co. | | 24 | 1650 4 26 Reo Motor Truck Co. | | 32 | *3500 4 32 Pacific Metal Products Co. | | 34 |
| *2250 4 23 Canopy Top, Stegeman Motor Car Co. | | 24 | 1650 Electric, Flare Board, General Motors Truck Co. | | 42 | *3500 4 32 Canopy Top, Stegeman Motor Car Co. | | 34 |
| *2300 4 29 Crown Commercial Car Co. | | 26 | 1675 4 26 South Bend Motor Car Works | | 32 | *3500 4 32 Stake, Nevada Mfg. Co. | | 34 |
| *2300 Electric, Stake, Capitol Truck Mfg. Co. | | 40 | *1750 4 26 Flare Board, South Bend Motor Car Works | | 32 | *3550 4 36 Furniture Van, Harder Auto Truck Co. | | 34 |
| *2300 Electric, Stake, Anderson Electric Vehicle Co. | | 40 | 1800 4 35 Beck & Son | | 30 | *3700 4 29 Moving Van, H. E. Wilcox Motor Co. | | 34 |
| *2300 4 29 Panel, H. E. Wilcox Motor Co. | | 24 | *1800 4 36 Flare Board, Reo Motor Truck Co. | | 32 | *4000 4 36 Stake, Four Wheel Drive Auto Co. | | 34 |
| *2370 Electric, Stake, Waverley Co. | | 42 | *1825 4 36 High Stake, Reo Motor Truck Co. | | 32 | | | |
| *2400 Electric, Panel, Capitol Truck Mfg. Co. | | 40 | *1850 4 26 Canopy Top, Reo Motor Truck Co. | | 32 | | | |
| *2500 Electric, Panel, Waverley Co. | | 42 | 1850 4 27 O. K. Motor Truck Co. | | 30 | | | |
| *2500 4 26 Flare Board, Nordyke & Marmon Co. | | 24 | *1875 4 26 Screen Side, Reo Motor Truck Co. | | 32 | | | |
| *2500 Electric, Panel, Anderson Electric Vehicle Co. | | 40 | *1875 4 35 Stake, Beck & Son | | 30 | | | |
| *2500 4 26 Nordyke & Marmon Co. | | 24 | 1900 4 26 General Motors Truck Co. | | 30 | | | |
| *2500 4 26 Panel, Nordyke & Marmon Co. | | 24 | *1975 4 27 Stake, O. K. Motor Truck Co. | | 30 | | | |
| *2600 4 23 Chicago Pneumatic Tool Co. | | 22 | 2000 4 27 Stake, Palmer-Meyer Motor Car Co. | | 32 | | | |
| | | | *2000 4 35 Panel, Beck & Son | | 30 | | | |
| | | | *2000 4 35 Flare Board, Beck & Son | | 30 | | | |
| | | | *2025 4 27 Flare Board, O. K. Motor Truck Co. | | 30 | | | |
| | | | 2100 4 21 Stake, Wichita Falls Motor Co. | | 32 | | | |
| | | | 2100 4 27 Amalgamated Motors Corp. | | 30 | | | |
| | | | *2100 4 27 Panel, O. K. Motor Truck Co. | | 30 | | | |
| | | | 2200 4 23 Canopy Top, Sandow Truck Co. | | 28 | | | |
| | | | 2200 4 32 Buckeye Mfg. Co. | | 26 | | | |
| | | | 2250 4 27 Flare Board, Nelson & LeMoon | | 24 | | | |
| | | | *2300 4 32 Stake, Buckeye Mfg. Co. | | 26 | | | |
| | | | *2300 4 32 Panel, Buckeye Mfg. Co. | | 26 | | | |
| | | | *2300 4 32 Flare Board, Buckeye Mfg. Co. | | 26 | | | |
| | | | *2300 4 32 Mogul Motor Truck Co. | | 30 | | | |
| | | | 2375 4 27 Stake, Service Motor Car Co. | | 26 | | | |
| | | | *2400 4 23 Flare Board, Sandow Truck Co. | | 28 | | | |
| | | | *2470 4 23 Stake, Sandow Truck Co. | | 28 | | | |
| | | | 2500 4 Stake, Robinson Motor Truck Co. | | 32 | | | |
| | | | *2600 4 29 Rockford Motor Truck Co. | | 32 | | | |
| | | | *2600 4 23 Panel, Sandow Truck Co. | | 28 | | | |
| | | | 2500 4 29 H. E. Wilcox Motor Co. | | 32 | | | |
| | | | 2500 4 30 Stake, Dorris Motor Co. | | 32 | | | |
| | | | 2600 4 27 DeKalb Wagon Co. | | 26 | | | |
| | | | 2650 4 27 Stake, Pacific Metal Products Co. | | 26 | | | |
| | | | 2650 4 27 Stake, Detroit-Wyandotte Motor Co. | | 30 | | | |
| | | | 2700 4 36 Flare Board, Avery Co. | | 26 | | | |
| | | | 2750 4 29 Harder Auto Truck Co. | | 32 | | | |
| | | | 2750 4 29 Flat Side Stake, Old Reliable Motor Truck Co. | | 30 | | | |
| | | | 2800 4 28 Stake, Duplex Power Car Co. | | 32 | | | |
| | | | 2800 Electric, Anderson Electric Car Co. | | 32 | | | |
| | | | 2800 4 29 Stake, Sternberg Mfg. Co. | | 32 | | | |
| | | | *2800 4 29 Screen Side with Cab, H. E. Wilcox Motor Co. | | 32 | | | |
| | | | 2800 4 36 Packard Motor Car Co. | | 30 | | | |
| | | | 2850 4 32 Dumping, Velle Motor Vehicle Co. | | 30 | | | |
| | | | 2950 4 26 Mals Motor Truck Co. | | 28 | | | |
| | | | 2950 4 27 Stake, Stegeman Motor Car Co. | | 32 | | | |
| | | | 3000 Electric, Capitol Truck Mfg. Co. | | 42 | | | |
| | | | 3000 4 29 Harder Auto Truck Co. | | 32 | | | |
| | | | *3000 4 32 Stake, Velle Motor Vehicle Co. | | 32 | | | |
| | | | 3000 4 29 Crown Commercial Car Co. | | 30 | | | |
| | | | 3000 4 26 Mals Motor Truck Co. | | 30 | | | |
| | | | | | | | | |
| 2500 Pound Commercial Cars | | | 4000 Pound Commercial Cars | | | 7000 Pound Commercial Cars | | |
| 1300 4 29 Stake, General Motors Truck Co. | | 26 | 1350 2 39 Brastie Motor Truck Co. | | 30 | *2250 4 40 Stake, General Motors Truck Co. | | 36 |
| | | | *1450 2 29 Flare Board, Brastie Motor Truck Co. | | 30 | 2400 4 40 General Motors Truck Co. | | 36 |
| | | | *1450 2 29 Stake, Brastie Motor Truck Co. | | 30 | 2550 4 39 Wichita Falls Motor Co. | | 36 |
| | | | 1650 4 26 Reo Motor Truck Co. | | 32 | 3350 4 28 Kissel Motor Car Co. | | 36 |
| | | | 1650 Electric, Flare Board, General Motors Truck Co. | | 42 | 3400 4 Stake, Robinson Motor Truck Co. | | 36 |
| | | | 1675 4 26 South Bend Motor Car Works | | 32 | 3750 4 40 Dumping, A. O. Smith Co. | | 36 |
| | | | *1750 4 26 Flare Board, South Bend Motor Car Works | | 32 | 3750 4 40 Furniture Van, A. O. Smith Co. | | 36 |
| | | | 1800 4 35 Beck & Son | | 30 | 3850 Electric, Anderson Electric Car Co. | | 42 |
| | | | *1800 4 36 Flare Board, Reo Motor Truck Co. | | 32 | 4250 Electric, Covered Stake, Couple Gear Freight Wheel Co. | | 42 |
| | | | *1825 4 36 High Stake, Reo Motor Truck Co. | | 32 | *4475 Electric, Panel, Couple Gear Freight Wheel Co. | | 42 |
| | | | *1850 4 26 Canopy Top, Reo Motor Truck Co. | | 32 | | | |
| | | | 1850 4 27 O. K. Motor Truck Co. | | 30 | | | |
| | | | *1875 4 26 Screen Side, Reo Motor Truck Co. | | 32 | | | |
| | | | *1875 4 35 Stake, Beck & Son | | 30 | | | |
| | | | 1900 4 26 General Motors Truck Co. | | 30 | | | |
| | | | *1975 4 27 Stake, O. K. Motor Truck Co. | | 30 | | | |
| | | | 2000 4 27 Stake, Palmer-Meyer Motor Car Co. | | 32 | | | |
| | | | *2000 4 35 Panel, Beck & Son | | 30 | | | |
| | | | *2000 4 35 Flare Board, Beck & Son | | 30 | | | |
| | | | *2025 4 27 Flare Board, O. K. Motor Truck Co. | | 30 | | | |
| | | | 2100 4 21 Stake, Wichita Falls Motor Co. | | 32 | | | |
| | | | 2100 4 27 Amalgamated Motors Corp. | | 30 | | | |
| | | | *2100 4 27 Panel, O. K. Motor Truck Co. | | 30 | | | |
| | | | 2200 4 23 Canopy Top, Sandow Truck Co. | | 28 | | | |
| | | | 2200 4 32 Buckeye Mfg. Co. | | 26 | | | |
| | | | 2250 4 27 Flare Board, Nelson & LeMoon | | 24 | | | |
| | | | *2300 4 32 Stake, Buckeye Mfg. Co. | | 26 | | | |
| | | | *2300 4 32 Panel, Buckeye Mfg. Co. | | 26 | | | |
| | | | *2300 4 32 Flare Board, Buckeye Mfg. Co. | | 26 | | | |
| | | | *2300 4 32 Mogul Motor Truck Co. | | 30 | | | |
| | | | 2375 4 27 Stake, Service Motor Car Co. | | 26 | | | |
| | | | *2400 4 23 Flare Board, Sandow Truck Co. | | 28 | | | |
| | | | *2470 4 23 Stake, Sandow Truck Co. | | 28 | | | |
| | | | 2500 4 Stake, Robinson Motor Truck Co. | | 32 | | | |
| | | | *2600 4 29 Rockford Motor Truck Co. | | 32 | | | |
| | | | *2600 4 23 Panel, Sandow Truck Co. | | 28 | | | |
| | | | 2500 4 29 H. E. Wilcox Motor Co. | | 32 | | | |
| | | | 2500 4 30 Stake, Dorris Motor Co. | | 32 | | | |
| | | | 2600 4 27 DeKalb Wagon Co. | | 26 | | | |
| | | | 2650 4 27 Stake, Pacific Metal Products Co. | | 26 | | | |
| | | | 2650 4 27 Stake, Detroit-Wyandotte Motor Co. | | 30 | | | |
| | | | 2700 4 36 Flare Board, Avery Co. | | 26 | | | |
| | | | 2750 4 29 Harder Auto Truck Co. | | 32 | | | |
| | | | 2750 4 29 Flat Side Stake, Old Reliable Motor Truck Co. | | 30 | | | |
| | | | 2800 4 28 Stake, Duplex Power Car Co. | | 32 | | | |
| | | | 2800 Electric, Anderson Electric Car Co. | | 32 | | | |
| | | | 2800 4 29 Stake, Sternberg Mfg. Co. | | 32 | | | |
| | | | *2800 4 29 Screen Side with Cab, H. E. Wilcox Motor Co. | | 32 | | | |
| | | | 2800 4 36 Packard Motor Car Co. | | 30 | | | |
| | | | 2850 4 32 Dumping, Velle Motor Vehicle Co. | | 30 | | | |
| | | | 2950 4 26 Mals Motor Truck Co. | | 28 | | | |
| | | | 2950 4 27 Stake, Stegeman Motor Car Co. | | 32 | | | |
| | | | 3000 Electric, Capitol Truck Mfg. Co. | | 42 | | | |
| | | | 3000 4 29 Harder Auto Truck Co. | | 32 | | | |
| | | | *3000 4 32 Stake, Velle Motor Vehicle Co. | | 32 | | | |
| | | | 3000 4 29 Crown Commercial Car Co. | | 30 | | | |
| | | | 3000 4 26 Mals Motor Truck Co. | | 30 | | | |
| | | | | | | | | |
| 3000 Pound Commercial Cars | | | 5000 Pound Commercial Cars | | | 10,000 Pound Commercial Cars | | |
| 1450 Electric, Canopy Top, General Motors Truck Co. | | 42 | 2700 4 32 Ideal Auto Co. | | 32 | 2500 Electric, Canopy Top, General Motors Truck Co. | | 44 |
| 1500 4 29 Continental Truck Mfg. Co. | | 28 | 2750 4 32 Stake, Kissel Motor Car Co. | | 32 | 4350 4 38 Kissel Motor Car Co. | | 38 |
| 1500 4 23 Kalamazoo Motor Vehicle Co. | | 26 | 3000 4 36 Crown Commercial Car Co. | | 32 | 4600 4 44 Stake, Mogul Motor Truck Co. | | 38 |
| 1600 4 23 Fargo Motor Car Co. | | 26 | 3200 4 36 Mals Motor Truck Co. | | 32 | 6250 4 40 Packard Motor Car Co. | | 38 |
| 1650 4 29 Stake, Service Motor Car Co. | | 26 | 3250 4 29 Stake, Lewis Motor Truck Co. | | 32 | 4775 4 36 Covered Platform, Sternberg Mfg. Co. | | 38 |
| 1675 4 26 S. G. Gay Co. | | 26 | | | | | | |
| *1800 4 23 Express, Kalamazoo Motor Vehicle Co. | | 26 | | | | | | |
| 1700 4 33 Wisconsin Motor Truck Works | | 28 | | | | | | |
| *1715 4 23 Stake, Kalamazoo Motor Vehicle Co. | | 26 | | | | | | |
| *1775 4 26 Open Express, S. G. Gay Co. | | 26 | | | | | | |
| *1775 4 26 Stake, S. G. Gay Co. | | 26 | | | | | | |
| 1800 4 23 Sandow Truck Co. | | 28 | | | | | | |
| 1800 4 29 Service Motor Car Co. | | 26 | | | | | | |
| 1800 4 23 Wm. Landshaft & Son. | | 28 | | | | | | |
| 1800 4 26 D. F. Poyer Co. | | 28 | | | | | | |
| 1800 4 23 Star Motor Car Co. | | 28 | | | | | | |
| 1800 4 23 Jos. W. Moon Buggy Co. | | 28 | | | | | | |
| 1820 4 27 Federal Motor Truck Co. | | 26 | | | | | | |
| *1825 4 35 Stake, Wisconsin Motor Truck Works | | 28 | | | | | | |
| *1825 4 35 Flare Board, Wisconsin Motor Truck Works | | 28 | | | | | | |
| 1850 4 29 Continental Truck Mfg. Co. | | 28 | | | | | | |

TRUCKS EFFECT SAVING IN HANDLING GLASS

By the use of a special Peerless truck and trailer of unusually large carrying capacity, the National Lamp Division of the General Electric Company has made a great saving in the cost of transporting bulbs to be used in making incandescent lamps from its glass factory in Niles to its lamp factories in Youngstown and Warren, Ohio.

The specially designed Peerless truck has a wheelbase of 204 in. and carries a body of which the inside dimensions are 212 in. long, 100 in. high and 84 in. wide. A trailer made of channel iron frame, truck front axles and truck front wheels, carries a body of precisely the same dimensions. Between the two the truck and trailer have a cubic capacity equal to the ordinary boxcar.

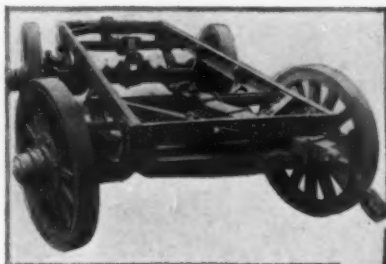
The truck loads at the glass works in Niles and delivers to the Youngstown Mazda Lamp Division, the Trumbull Mazda Lamp Division, Warren; the Mahoning Mazda Lamp Division, Warren, and the Ohio Division in Warren. The roads traveled are for a considerable distance worn out macadam with many chuck holes. There is some good brick pavement and in some places no pavement at all. The average mileage of the truck per day is 35. The truck and trailer carry a load of which the weight is from 3000 to 4000 lbs., but which completely fills both of the large bodies. The actual cost of shipment by rail or truck has been found to be nearly the same. But when the shipment went by rail it was necessary to wrap the bulbs in tissue paper and pack them in boxes. When they reached the lamp works it was necessary to open the boxes, take off the tissue paper and plate them in trays ready for use. Since the truck has been used the bulbs are put into it in trays ready for use, and both the packing and unpacking have been entirely eliminated.

In spite of the fact that the roads traversed are often very rough and the truck



Peerless, Hauling Electric Bulbs

The truck and trailer have a cubic capacity equal to a boxcar

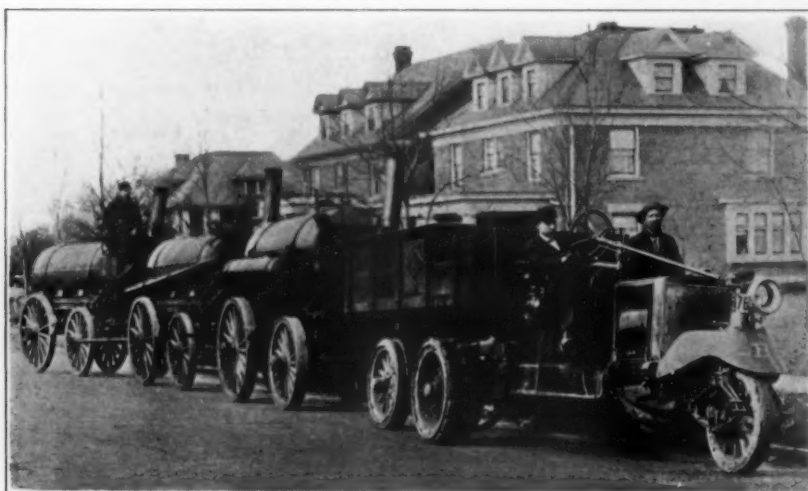


Troy Truck Trailer

Built by the Troy Wagon Works Company, Troy, Ohio. Principal dimensions are: wheelbase, 83 in.; tread, 64 in.; height of chassis, 34½ in.; width of chassis, 41½ in.; height of wheels, 6 in.; width of steel tire, 4 in. Bower roller bearings are used. Capacity is five tons.



travels always at a good speed, the breakage has been found to be less than half what it was when the bulbs were carefully packed and shipped by rail. The saving accomplished is so great that the truck and trailer earn their cost about every nine months.



Barrett Asphalt Trailer Train

Three heavy asphalt tank wagons, with tar-heating outfits, belonging to the Barrett Manufacturing Company, of Cleveland, which are being drawn by a Knox-Martin tractor. There were twenty-eight tons total weight in the entire outfit, but the tractor easily hauled it around sharp turns and up the seven per cent grade on Cornell street. By this system of hauling the wagons in a train, five teams have been displaced. The wagon which is attached directly to the tractor and used for carrying fuel for the asphalt heaters is the rear end of a motor truck.

Standard Underground Cable Company

announces the following changes in its Chicago and St. Louis office territories, consequent upon the death of J. R. Wiley, last fall, who for nearly twenty years was western manager with headquarters in Chicago. E. J. Pietzsker, formerly southwestern sales manager, has become western and southwestern sales manager in charge of the Chicago and St. Louis offices; W. M. Rogers, formerly chief clerk and assistant to Mr. Wiley, is assistant western sales manager, with headquarters at Chicago; R. C. Houck has been appointed assistant southwestern sales manager, with headquarters at St. Louis. He has been connected with that office since its organization; E. E. Woodbury has been added to the selling force of the St. Louis office, and has been transferred from the general sales department of the company at Pittsburgh.

Fire Commissioner Adamson, of New York, has issued orders to the effect that except when answering a fire alarm, fire department motor vehicles must obey traffic regulations. The emergency wagons of the fire alarm telegraph bureau are also under the same orders, except when called for circuit repair work.



Two New British Daimler Designs

Firm Responsible for London 'Bus Design Turns Out Two and Five-Ton Models

By OUR FOREIGN CORRESPONDENT

THE commercial cars turned out from the works of the Coventry Daimler Company in Great Britain are of peculiar interest, because the only model to which they have hitherto devoted themselves in all their many years of experience is that of the London 'bus companies with heavy chassis. For in the production of their three-tonner the Daimler Company have been working hand in glove with the big London General Omnibus Company, who run something like two thousand five hundred cars in and around London. This fact lends particular interest to the two new designs which have been just brought out for loads of 2 and 5-tons respectively.

Knight Sleeve Valve Engines Used

There is no need to dilate on the obvious; a brief description of each will suffice to indicate the latest practice in Great Britain.

Taking the two-tonner first, the four cylinders of the engine are cast in pairs, and with a bore of $3\frac{1}{4}$ in. and a stroke of $5\frac{1}{2}$ in. give about 29 h.p. at about 1000 r.p.m. Of course they are of the Knight sleeve valve type. Lubrication is supplied by a multiple plunger pump, the big ends being fed with oil which they scoop up from troughs that maintain the oil at a constant level, the height of these troughs being adjustable. The circulation water is pumped through a radiator, the size of which is made to suit requirements for European or tropical work, and its cooling action is assisted by a belt driven fan.

Some Points About the Transmission

Though a cone clutch is fitted as standard practice, one of a single plate type may be fitted if required. For all round commercial work the Daimler believe in four spur gears, which in this case give speeds

of 3, 6, 7, 10, and 14.5 m.p.h. at 1000 r.p.m. of engine, and 4.5 m.p.h. in the reverse under the same conditions. Both front and back wheels are of the same size $35\frac{1}{2}$ in. in diameter (front wheels single, rear wheel twin tires) which with a back axle worm ratio of 7.25 to 1 will give an idea of the gear box ratios.



Daimler Method of Lubricating Spring Bolts

Upper left shows the grease cups in place. Upper right shows the chain-attached cap, a good way of preventing its being lost. Lower shows the bolt itself with large head for grease reception, the hole from the center of the bolt to its surface and the spiral groove, which spreads the lubricant over the entire bolt.

The leather ring type of universal joint employed by the Daimler Company has already been described in these pages, so it is only necessary to call attention to the illustration of it, and to its simplicity and low cost of production.

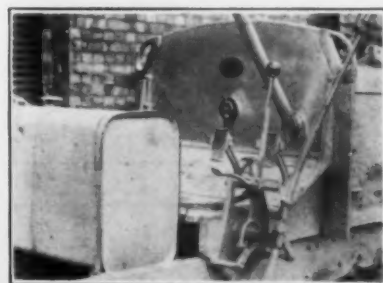


Members of Daimler Leather Universal

The simplicity of the joint and its low cost of production are noteworthy

Shafts that slide are something more than castellated; they might best be called serrated, the keyways being numerous enough to give the shaft the appearance of a wide spur wheel.

In braking arrangements the new chassis follows American practice: that is to say,



Control of New Daimler

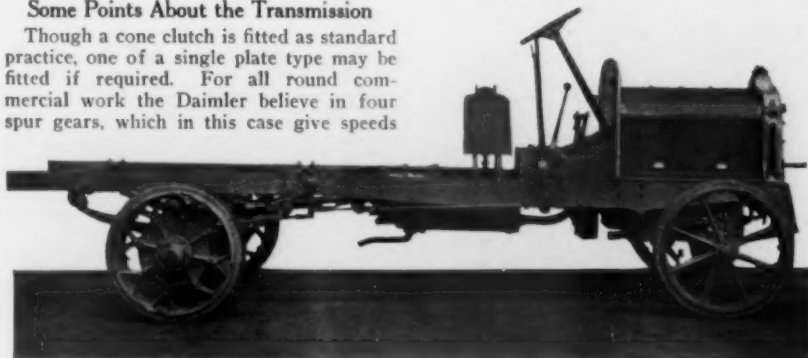
Its simplicity is a feature

both brakes act on drums on the rear wheels, each set, however, having its separate drums.

Mention should be made of the frame, which is of ash reinforced by nickel steel flitch plates.

Leading Dimensions of the Two-Tonner

Finally, the chassis weighs 7156 lbs; overall length, 17 ft. $9\frac{1}{2}$ in.; overall width, 6 ft. 4 in.; wheelbase, 11 ft. 6 in.; wheel track



Elevation of Two-Ton Daimler Chassis

The four-cylinder Knight-type motor is carried under the hood. The transmission is carried amidships with leather universal joints on each end of the gear box

5 ft. 3 in.; width of frame, 3 ft. 5½ in.; and from back of driver's seat to end of frame 9 ft. 11 in.

The Five-Tonner—Either Spur or Chain Gear Box

In the five-tonner the engine arrangements are the same; the only difference is in size, the bore in this case measuring 4 5-16 in., the stroke 5¾ in., and the horsepower amounting to 40 at 1000 r.p.m. In the gear box either a four-speed spur mechanism, or three-speed chain-driven transmission, can be provided, and the former gives 2.54, 5.05, 8.59 and 12.74 m.p.h. respectively at 1000 r.p.m. of the engine. The ratio of the axle worm can either be 8.25 to 1 or 9.25 to 1.

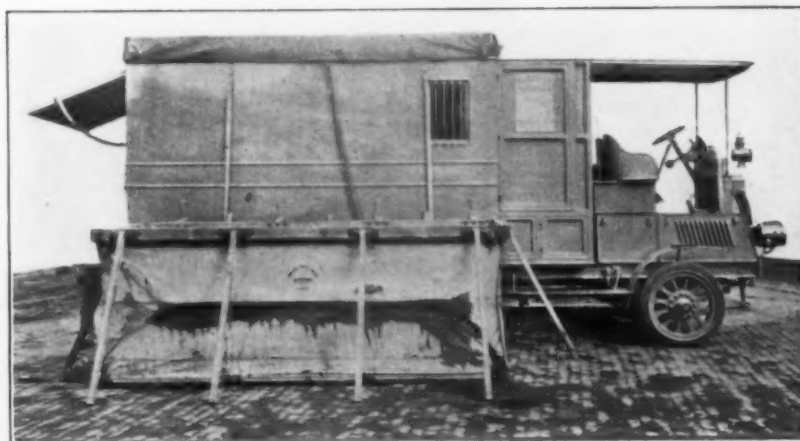
While the steering in the two-tonner depended on a worm and wheel, in the bigger machine a screw and nut arrangement is used, but in all other respects the practice adopted in the two-tonner is followed in the larger machine.

Tractive Force, Road Resistances and Climbing Abilities

Finally, the table given below, showing the performance capacities of the heavier Daimler chassis is instructive.

PORTABLE WATER STERILIZER

During the grand manoeuvres of the French army this year, trial was made of an automobile designed to afford a supply of fresh water to the troops. The apparatus necessary for this sterilization was located inside a body mounted on a Schneider chassis similar to that used by the Compagnie Générale des Omnibus de Paris, and was supplied by the Compagnie Générale de l'Ozone. The process is carried out, on the Otto system, by forcing the water as required through special filters by a pump driven directly by the car engine. But while this water emerges from the filter entirely free of matter in suspension, any germs which it contains still exist, and it is colored, and possesses a more or less disagreeable smell. Accordingly ozone is forced into the water on leaving the cisterns, with the result that the color, yellow before, becomes blue, it loses all disagreeable smell, and becomes "sparkling," while all the germs disappear. The resulting



Sterilizer Unloaded and Ready for Use



Truck Loaded With French Portable Sterilizer

water is absolutely safe to drink, and while it is necessary to emphasize the enormous value of such apparatus for military work where enteric and other diseases are more

to be feared than the enemy, it also has its civil uses, and is being adopted for municipal services in Paris and in numerous towns in France.

TABLE SHOWING PERFORMANCE OF HEAVY DAIMLER TRUCKS

| Maximum Gradients Climbable | | | | | | | | | | | | |
|--|---|---|---|---|---|----------------------------------|-----------------------------------|----------------------------------|----------------------|-----------------------|--------------------|-------------------------|
| Road resistance 300 lbs. per ton (rough grass land)..... | Road resistance 200 lbs. per ton (soft gravel)..... | Road resistance 90 lbs. per ton (very rough macadam)..... | Road resistance 60 lbs. per ton (good macadam)..... | Road resistance 45 lbs. per ton (asphalt, smooth wood)..... | Maximum road resistance on level. Lbs. per ton..... | Total wind pressure in lbs. | Useful tractive pull in lbs. | Total tractive pull in lbs. | Speed in M.P.H. | Total Gear Reduction. | No. of speeds..... | Chassis..... |
| 1 in 15 | 1 in 9 | 1 in 6.25 | 1 in 5.75 | 1 in 5.5 | 450 | Neglig. | 2920 | 2920 | 3.26 | 36.1 to 1 | First | 3-ton gross weight |
| 1 in 84 | 1 in 16.4 | 1 in 56 | 1 in 13.5 | 1 in 12.3 | 226 | 8 | 1480 | 1472 | 6.44 | 18.27 to 1 | Second | 6.5 tons = 14,560 lbs. |
| | | 1 in 380 (Flat) | 1 in 6 | 1 in 44 | 130 | 24 | 870 | 846 | 10.95 | 10.75 to 1 | Third | |
| | | | 1 in 62 | 1 in 44 | 96 | 32 | 675 | 623 | 16.21 | 7.25 to 1 | Fourth | |
| 1 in 17 | 1 in 9.7 | 1 in 6.5 | 1 in 6 | 1 in 5.8 | 430 | Neglig. | 3340 | 3340 | 2.85 | 41.2 to 1 | First | 4-ton gross weight |
| | 1 in 140 | 1 in 18 | 1 in 14.3 | 1 in 13 | 216 | 6 | 1674 | 1674 | 5.67 | 20.75 to 1 | Second | 7.75 tons = 17,360 lbs. |
| | | 1 in 63 | 1 in 34 | 1 in 27.7 | 126 | 18 | 972 | 972 | 9.65 | 12.2 to 1 | Third | |
| | | 1 in 520 (Flat) | 1 in 65 | 1 in 45 | 94 | 40 | 770 | 730 | 14.28 | 8.25 to 1 | Fourth | |
| 1 in 18.6 | 1 in 10 | 1 in 6.8 | 1 in 6.2 | 1 in 6 | 420 | Neglig. | 3740 | 3740 | 2.54 | 46.1 to 1 | First | 5-ton gross weight |
| | 1 in 190 | 1 in 18.4 | 1 in 14.8 | 1 in 13.4 | 212 | 5 | 1890 | 1885 | 5.05 | 23.3 to 1 | Second | 8.9 tons = 19,936 lbs. |
| | | 1 in 68 | 1 in 35.5 | 1 in 28.5 | 123 | 15 | 1095 | 1110 | 8.59 | 13.7 to 1 | Third | |
| | | (Flat) | 1 in 68 | 1 in 46.5 | 93 | 32 | 828 | 828 | 12.74 | 9.25 to 1 | Fourth | |

THE COMMERCIAL CAR IN FRANCE

Some Impressions of Our Foreign Correspondent

Injudicious Fostering

IN these days when the progress of the industrial motor vehicle is so great, and future prospects indicate worldwide development, it is rather strange to find this section of the motor industry anywhere regarded as a matter of purely secondary importance. That this must be the point of view adopted in France seems clear from the fact that the organizers of the French Motor Salon, rather than compress the space available for touring cars, refused to admit industrial vehicles to the main building, and finally accommodated them in a temporary structure of a very unpretentious nature. The treatment of the whole movement in France is a curious mixture of neglect and pampering. The whole thing seems to be based on the assumption that industrial vehicles cannot be run at a profit on their own merits, that they are only to be encouraged under certain conditions, and that this encouragement must take the form of substantial cash payments to render profitable operation possible.

The Tradesman and the Light Van

On the whole this state of affairs might be seen reflected fairly accurately in the last Paris Show, which confirmed impressions formed by a fairly careful study of the street traffic in Paris and other French towns. Retail tradesmen in a big way of business in France are adopting motor delivery vans most freely, but it is difficult to believe that in so doing they are influenced principally by prospects of economy as compared with horse haulage. All indications lead to the conclusion that what they chiefly want is something smart and attractive, which can be driven at a high speed, and will give the impression of prosperity and good business.

Transport Services Too Much Like Monopolies

Under the prevailing circumstances, manufacturers and wholesalers are very chary in adopting heavy motor vans and motor trucks, in spite of the substantial encouragement given by the big army subsidy, which is a fair equivalent to a reduction in price of about \$1500 in respect of each chassis employed. Apparently, the economical side of the whole proposition is not as yet properly understood in France, and the misconception still existing is rather encouraged not only by the action of the military authorities, but by that of the State and the local administrations. There are in many parts of France services of passenger carrying motor vehicles. In all, it appears that there are something like five to six hundred cars working on these services, all of which are materially helped by a subsidy amounting to about 800 francs per annum for every kilometre regularly covered (about \$124 a mile). Stipulation is made in such cases, that at least one lorry for the carriage of goods must be kept in operation along the same route, and the main idea appears to be to provide

some more or less adequate general transport in the absence of any convenient railway. Enquiries all lead to the conclusion that the operating costs of the vehicles working these services are far higher than those of corresponding types in Great Britain. With less assistance from outside and more consideration of questions of economy, the services could, judging by British experience, be made profitable in many instances at reasonable rates and fares. As things are, these are very high, with the result that the growth of traffic is impeded, and the services do not become

really profitable. All this subsidy and assistance creates a general atmosphere not far removed from monopoly to home manufacturers, and this in turn means a lack of competition and a carelessness among those who could, if they took the trouble, profit by the experience of designers in other countries. France may be still in the forefront with regard to the touring car industry, but is dropping further and further behind the United States and Great Britain in the development of the commercial car along sound and economical lines.

A New French Van Design

As the makers of the Hurtu car have behind them such a long experience in the construction of the private car, and turn out a really unusually effective vehicle of this class, the light van chassis which they have recently produced is an instructive mechanism. It is built, much on the lines of their private car, in two sizes, 10 and 14 h.p., but as the only difference between these two is in size, one description will suffice for both.

An Engine and Gearset Unit

A very neat unit form of power plant has been provided, and the general result may be summed up in the two words, "simplicity" and "compactness." The four cylinders of the engine are in one casting, $2\frac{3}{4} \times 4 \times 5-16$ in. bore and stroke for the 10 h.p., $2 \times 15-16 \times 4\frac{3}{4}$ in. for the 14 h.p. model, the weight of the chassis working out to 1288 and 1344 lbs. respectively. The system of lubrication on the Hurtu engines is an improved form of trough and pump forcing to the two main bearings at the ends, and as all the oil is carried inside the engine, no outside pipes or tanks with their contingent leakages are involved. Oil is poured into the crank case through a filler at the front, and the level for the correct quantity of oil—about $1\frac{1}{4}$ gals.—is shown by a gage rod. A gear pump positively driven by skew transmission off the crank shaft, then circulates the lubricant

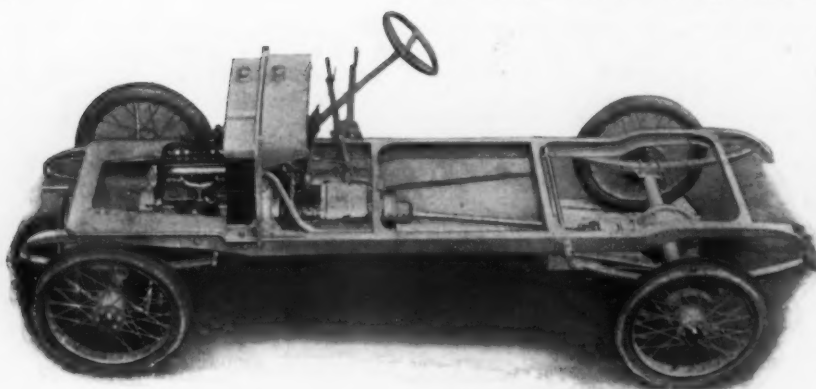
through passages cast in the crank case (to avoid piping) to the crank shaft bearings at each end, whence the oil flows by gravity to the troughs under the big ends, finally overflowing to the crank case sump



Front View of Hurtu
Four-cylinder water-cooled motor under sloping hood



Side View of Hurtu Van
This is a well-finished French product



The 14 h.p. French Hurtu Van Chassis
Note the compact power and gear plant

and filter; after which it is again circulated. The filter should be cleaned, and the oil renewed every one thousand miles or so, and if necessary the pump can be drawn for inspection merely by undoing the three bolts. The thermo-syphon circulation is much on Renault lines, as also is the bonnet.

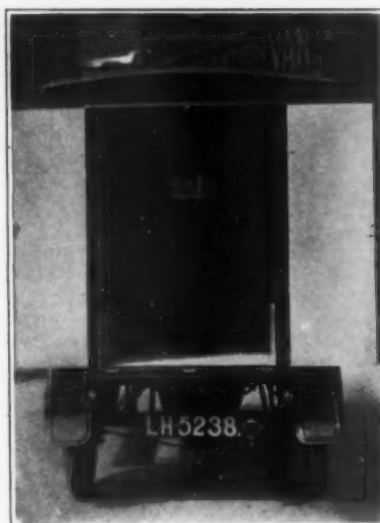
A Point in Control

A feature about the control is that the hand brake, if put on hard, disengages the leather cone clutch. This arrangement (as is the whole car) is exceedingly pleasant to handle, the more so, as it is a four-speed vehicle with bevel transmission. For the rest this smart little vehicle is sufficiently explained by the illustrations.

HIGH RUNNING COSTS AND YET PROFITABLE

Particulars of the more important road motor services which were founded in Italy by Signor Gino Toller, a prominent engineer, are now to hand. Seeing that this country, owing to lack of railway development in many parts, affords particular scope for motor services, the figures available are worth attention, always bearing in mind that the very moderate fares (about 3 cents to the mile) are supplemented by very generous government subsidies, and that some of the country is very difficult, and roads none too good, as may be inferred by the tire costs.

The accompanying table gives concisely in figures what is being done by motors on these various services, but it should be pointed out that the figures for the cost of installation per vehicle include the proportion charged to each vehicle, for the build-



Rear View of Hurtu
Note the low loading platform and the amount of load space

ing of garages, offices, and, indeed, all the organization necessary to run it. As a matter of fact, the first cost of the cars varies from about \$3000 to \$4000.

Each car costs from 3.9 to 7.2 cents a mile for fuel, 4.5 to 9 cents for tires, 6 to 9 cents for labor and .112 to .24 cents for replacements, while the total cost works out to about 36 cents per car mile. We fancy that such results would hardly suit American ideas, but the natural difficulties of hilly country, bad roads and dear fuel

must not be overlooked. As a matter of fact, even at such a cost these cars pay, because the government finds it pays them to subsidize the cars so heavily, rather than meet the burden of capital expenditure on railways.

On the staff a chief mechanic gets 3000 francs a year (about \$600); an ordinary workman, 2160 francs (\$440); a driver, \$450, and a clerk, \$500.

The cars on an average can accommodate fifteen passengers, although the largest, which are chiefly used for summer traffic, will carry up to thirty-one; and the number of inhabitants in the districts served works out to about six hundred per car.

DRIVERS AND INSURANCE

By PIERCE-ARROW MOTOR CAR COMPANY

When a man purchases insurance, he is most careful to know the standing of the company selling the insurance, he is very particular as to the wording of the several clauses, and he does not consider his time wasted in investigating many different forms of policy. Truck owners are no exception in this particular, yet very few trucks are burned and the great bulk of premiums is paid simply to secure peace of mind.

Every working day, the truck owner places his investment in the hands of a single man. This man can do more damage in a few hours than the amount of the premium cost of an insurance policy can repair. Does the owner exercise as much care in selecting this man as he does in purchasing his insurance? We believe that, in most cases, he does not, but we feel sure, that, if he realized the value of a careful and responsible driver, he would exert every faculty to secure such a man.

A good driver is the owner's best insurance and lack of care in his selection, or unwillingness to pay a good man, is even more foolish than insuring in a "fly-by-night" company.

Every street car track crossed, every hill descended, every stop, every start, may mean dollars from the owner's pocket. Truck speeds may be held down to a safe maximum on smooth, level roads; the engine governor does this. Truck speeds may not be held down to any maximum in coasting, by purely mechanical means; the driver must control that kind of speed. The safe maximum speed on a smooth road is a destructive excess over rough cobbles or across sharp, wet car tracks. The driver should use his eyes and brains as an auxiliary to the engine governor.

The cost of intelligently operating and maintaining a truck for one year is as much as the first cost of that truck. If the operation be unintelligent, this cost may be far greater. The men that minutely consider first cost should not be less careful in considering their operating costs. The best material and workmanship will not long withstand abuse such as any careless driver can unthinkingly give. Brains on the driving seat are just as vital as brains in the purchasing department and brains must be paid for.

Mr. Truck Owner; if your truck is costing you more to operate than your competitor's truck costs him, look to your driver for the answer.

| Lines | Length in Miles | Number of Cars | Number of Trips Per Day | Number of Inhabitants Served by Cars | Cost Per Car For Installation | Cost of Working Per Car Mile Cents |
|---------------------------|-----------------|----------------|-------------------------|--------------------------------------|-------------------------------|------------------------------------|
| Potenza-Corleto-Perticara | 103 | 9 | 2 | 74.458 | 6666 | 22 |
| Terni-Leonessa | 42 | 4 | 2 | 20.000 | 5000 | 25 |
| Sassuolo-Piandelagotti | 40 | 5 | 2 | 33.000 | 5000 | 24 |
| Verosa-Verrero | 34 | 4 | 2 | 20.654 | 3500 | 22 |
| Spoletto-Norcia | 30 | 5 | 2 | 35.000 | 4000 | 20 |
| Piacenza-Bobbio | 29 | 4 | 4 | 65.226 | 3500 | 19 |
| Dronero-Acceglio | 22 | 4 | 2 | 20.000 | 4000 | 20 |
| Lugagnano-Bardi | 22 | 3 | 4 | 18.373 | 4933 | 25 |
| Barge-Paesana-Criscolo | 17 | 3 | 2 | 18.589 | 4666 | 15 |
| Carpeneto-Castellano | 11 | 2 | 2 | 16.471 | 5000 | 24 2/3 |



Motor Truck Design and Construction Made Plain

Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is the sixth installment of a series of articles by this well-known writer, covering in a non-technical way the various constructions now current practice in commercial car design. These articles will take up, in order, the general types of chassis, the advantages and disadvantages of each, illustrated by simple diagrams, and in logical order, motor construction, ignition, carburetion, cooling, lubrication, etc., until each part of the truck has been dealt with.

THE MOTOR COOLING SYSTEM

PART VI.



CONTINUING from the previous article we can next investigate the cooling system, considering first the office of the cooling system. This system must cool the cylinder walls to such an extent as to permit of the proper lubrication and to prevent the carbonization of the lubricating oil. Pre-ignition will also occur if the metal is permitted to heat to a red heat causing the gas to ignite on the compression stroke. It is the general impression that the office of the cooling system is to abstract the heat from the gases within the cylinders, this heat having been generated by the explosion. This is not the case, for, as a matter of fact the duty of the cooling medium is to keep the cylinder walls cool, the heat of the gases being converted into useful energy.

The Direct or Air System

There are two general types of cooling systems, the direct or air system and the indirect or a system using a cooling medium such as water or oil. The term direct is applied to the air system, as there is no intermediate transfer of heat from the cylinder walls to the radiating surfaces by means of a cooling liquid. Air cooling is generally effected by cooling ribs or fins as they are sometimes called, cast integral with the cylinder walls and head. Some mechanical method, such as mounting a fan at front of the motor, or combining it with the fly wheel is generally resorted too for inducing air circulation. Fig. 1 illustrates a typical air cooling system. This type of cooling system is most popular on the low-priced vehicles using two, three and four-cylinder motors. It may be used on either two or four-cycle motors.

The Indirect System—Water or Oil

The indirect cooling system as mentioned above involves the circulation of a liquid such as water or oil, to absorb the heat and deliver same to a current of air which is passed over the surface of the radiator within which the liquid in its heated state is circulated. At present water is used as

the medium in all indirect systems. Oil was used in some cases, but it presented serious disadvantages. Water may be circulated in two ways, first by the natural system which is termed the thermo syphon system, and second under pressure through the use of a suitable pump driven by the engine.

The indirect system may be described as follows: Water is circulated from the lower water tank of the radiator through a distributing manifold to the lowest point of the cylinder water jackets, and, as it becomes heated, its specific gravity de-

creases, rises and flows out through the outlet manifold located on the top of the cylinders, to the top of the radiator, passing into the upper tank. From here it is distributed to various water passages through which it passes to lower tank and is recirculated. These water passages are separated by air spaces for heat radiation.

In the forced circulation, a pump draws water from the lower tank and forces it through cylinders, as well as creating a pressure to force it through the water passages of the radiator. In the thermosyphon system, the pump is eliminated and

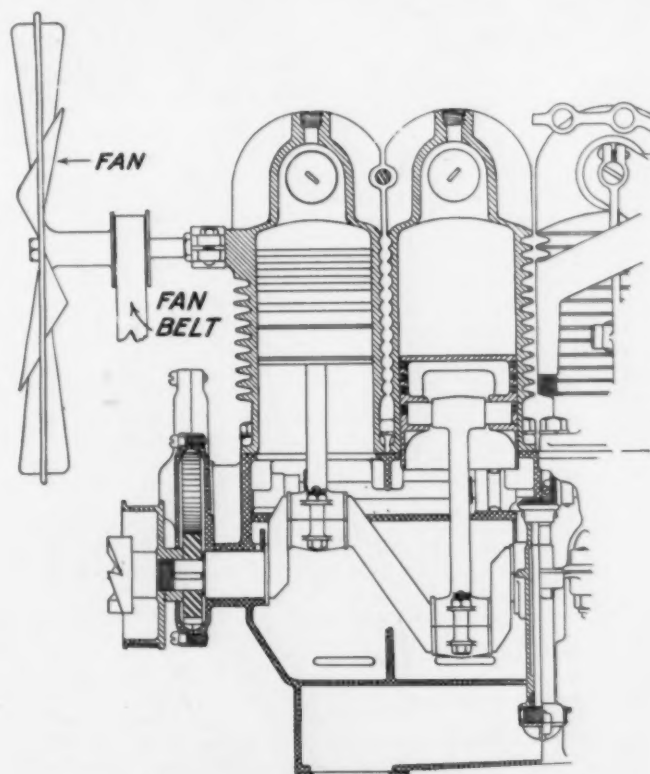


Fig. 1. Sectional View of Air-Cooled Motor

The fan in front draws air through a screen in the front of the hood. The air passing over the fins on the cylinder walls and heads, cools them

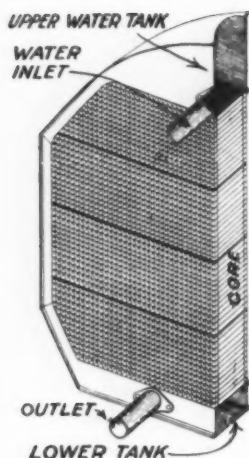


Fig. 2. Cutaway Section of Radiator

A radiator is composed of an upper and lower water tank, and the core, where the water is separated into small streams and cooled by cold air passing over the core.

circulation is induced by the heat of the motor. The water under the influence of heat sets up a circulation. It can readily be understood that the heat replaces the pump and acts as the moving force on the water.

Types of Radiators

Many different types of radiators have been worked out since the early days of the industry. The types in use at present are termed the honeycomb, cellular, vertical tube and vertical tube built-up types. The radiator is necessarily comprised of an upper and lower water tank and the core in which the water is divided into small streams, which are separated by air passages for heat radiation as shown in Fig. 2. The type of radiator is generally defined by the type of core used.

The true honeycomb core consists of a series of six sided or hexagonal shaped tubes fastened into the water tanks in such a way as to allow of air space between the water passages. This type is frail and not to the writer's knowledge in use at present on commercial cars.

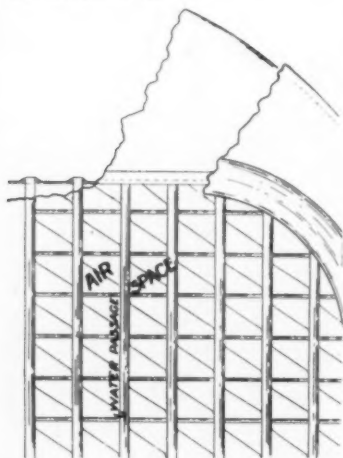


Fig. 4. Section of Vertical-Tube Type
The vertical tubes are strengthened by the attached fins

The more popular cellular core is often called a honeycomb. This consists of a series of square tubes placed either vertically or diagonally into the tank, forming a much more rigid structure. The vertical placing is more desirable, as this provides a continuous vertical tube from one tank to the other. It offers less resistance to circulation and is not so apt to clog up from dirt, rust and other substances. Radiating surfaces are approximately equal for either construction. This construction is clearly illustrated in Fig. 3.

The vertical tube type of core consists of a series of rectangular tubes fastened into the water tanks, with fins attached to them for heat radiation, as shown in Fig. 4. The fins also materially assist in strengthening the core, and in some cases they are made continuous so that the entire construction presents a very pleasing appearance similar to the cellular type. This vertical tube type of radiator is very much in evidence on the popular-priced vehicles, as its first cost is considerably lower than the cellular type.

During the past few years there has been a decided tendency to build up radiator cores from round copper tubes with sepa-

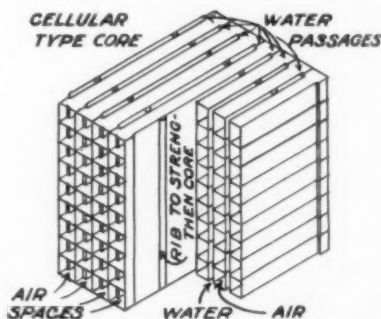


Fig. 3. Section of Cellular Type Core

The square tops are flanged on the ends and nested. The water circulates through small passages between the tubes, while the air passes through the tubes.

rate round or square cooling fins and cast water tanks, the upper tank usually being provided with ribs to assist in heat radiation owing to thicker section of metal necessary in casting these tanks. This type of radiator is illustrated in Fig. 5, with a tubular core and cast spaces between the tank to relieve the core of the strains due to the weight of the tanks and water.

Another popular priced truck uses this style of radiator. However, the tubes are fastened to the tanks by clamps in series of three. This construction presents an advantage in the simplicity of repair and the small cost of replacing these sections should they be damaged beyond repair. While this type of radiator presents some advantages in strength, the writer believes that it possesses a disadvantage in that it is not as efficient as the conventional style mentioned above. Only a certain portion of the tubes is exposed to the air currents, while the rear ones are naturally limited in cooling ability, owing to being obstructed by the forward ones. The volume of water is somewhat greater in these tubes for the same rate of circulation, so that the cooling effect is somewhat retarded. The writer has experimented with both types and has come to the conclusion that the conven-

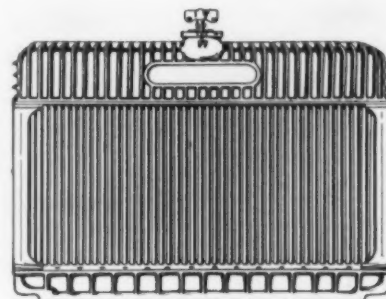


Fig. 5. Cast Water Tanks and Built-Up Cores

The thicker section of metal in the tanks necessitates the fins on the tanks

tional type is more efficient and will stand up under the most severe service when spring mounted.

Mounting of Radiators

Radiators may be mounted in two positions on the chassis frame; either in front of the car so that the air currents pass almost unobstructed through the passages, or in back of the engine against the dashboard, while on one particular chassis it is placed in the rear of the engine under the seat. Either of the latter two positions afford a somewhat more accessible engine and also afford a better protection for the radiator. However, this construction requires a proportionately larger radiator to obtain the same results as in the forward position.

In commercial car operation the heavy vibrations accompanying high speed on rough pavements and the distortion of the frame, place heavy strains on the radiator, so that it becomes necessary to mount it on springs and also provide a certain amount of universal movement to overcome frame distortion. These springs may be of flat spiral or coiled wire or of round or square section. This support is usually of a three point type, so that a limited amount of universal movement is obtained.

Fig. 6 shows a popular type of enclosed spring mounting combined with the front spring hanger brackets. Brackets, riveted to each side of the radiator, have extensions, which are mounted between two coiled wire springs in each spring bracket. This bracket has a small cover plate which retains the springs, and, together with the spring bracket, supports a vertical shaft, which acts as a guide for the radiator brackets. The radiator brackets are drilled out larger than the shaft, to provide for a certain amount of universal movement. The top of the radiator is further supported by a stay rod which is attached to the dashboard. A bumper extending from

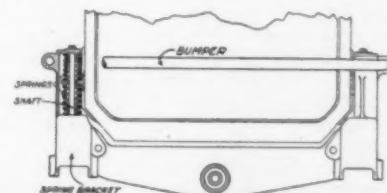


Fig. 6. Combined Enclosed Spring With Front Hanger Brackets

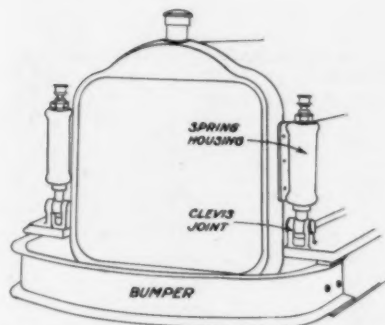


Fig. 7. Another Radiator Mounting
Universal motion is obtained through the clevis joints

one spring bracket to the other protects the radiator core from being damaged by colliding with the rear end of other vehicles.

Fig. 7 illustrates another type of spring mounted radiator. However, in this case a limited universal movement is obtained through a clevis joint on the frame bracket, while the bumper is set into the main frame channel.

Various constructions are resorted to in practice. However, they merely present different methods of accomplishing the same results.

Fig. 8 shows a construction using a flat spiral spring attached to a cradle upon which the radiator is mounted, being held by studs projecting through the lower water tank and cradle. One end of the flat spiral spring is bolted to the upper flange of the frame member, while the other end is rolled into an eye and slotted to fit over an eye on the cradle. A bolt is inserted through the spring and cradle eyes to form a permanent fastening. The bumper is fitted into the frame channels as in the previous case. Further protection is afforded the radiator by a wire screen which is fastened to the bumper and braced from the frame.

In some cases the cradles are eliminated, brackets being riveted to the sides of the radiator to which the springs are attached. Most all types of spring mountings permit of enough universal movement to relieve the radiator of the strains that are due to frame weaving.

Types of Water Pumps

There are four general types of water pumps; the gear, the centrifugal, the rotary or vane and the plunger types. The cen-

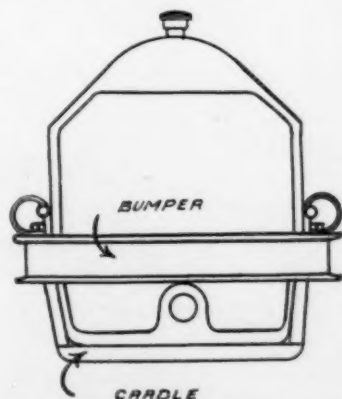


Fig. 8. Flat Spiral-Spring Mounting

trifugal is by far the most popular and the gear type is next in popularity, while the rotary or vane type is very little used on commercial car motors. The plunger type is entirely confined to marine work, where it is used to better advantage.

The centrifugal type illustrated in Fig. 9 is perhaps the simplest of all and the easiest to understand. It consists of a rotating member or paddlewheel which may either be formed integral with or keyed to the driving shaft and a case and cover which house the rotating member. In operation it is rotated at a high speed, the water entering at the center of the rotating member, flowing out on the arms or paddles and being thrown off by centrifugal force. This throwing off action is restricted by the case, so that the water is forced through the pump outlet.

The gear type of water pump is identical with the gear type of oil pump, with the exception of being much larger. It is illustrated in Fig. 10, and it can readily be seen that it consists of a pair of gears, a pair of shafts for them to rotate on and a case with cover to serve as a housing for the gears and to carry the shaft bearings. The

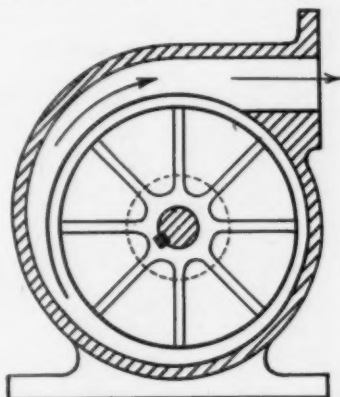


Fig. 9. Sectional View of Centrifugal Pump

Water enters at the center, flows down the vanes and is thrown off by centrifugal force. The case guides the water to the outlet.

arrows illustrate how the water enters the housing through the inlet pipe and is carried around between the spaces of the gear teeth and forced out through the pump outlet on the opposite side of the inlet. This type of pump is quite simple and was extensively used on the earlier types of commercial cars.

Both the gear and centrifugal types of pumps possess an advantage over other types, in that they provide a continuous stream of water. Between the two there is very little or no choice, unless it is that the gear pump is more likely to become noisy. They both do the work under substantially the same conditions.

The rotary or sliding vane pump shown in Fig. 11 consists of a cylindrical housing in which is located a disc of a thickness equal to the internal height of the housing, but of smaller diameter. The disc is located eccentrically with respect to the chamber and is cut with a diametrical slot dividing it into two halves, in which slots are located two sliding vanes which are pressed apart by a flat spring between them. The action of the vanes being to carry the water

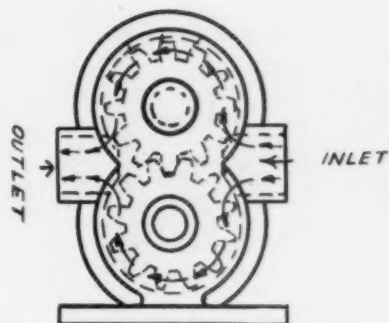


Fig. 10. Section of Gear Pump
The water enters, is carried around by the gear teeth and discharged

around from the inlet to the outlet as indicated by the arrows.

Water pumps are generally driven by shafts extending from timing gear housing and are provided with flexible or universal driving couplings. The coupling serves to keep the pump free from strains due to misalignment, and they are generally so designed that, when the pump freezes up, the coupling will break before any damage is done to the pump parts.

Fan as an Auxiliary

The motor must be cooled effectively regardless of car speed. To cool a commercial car motor under ideal conditions and most effectively would require a tremendously large radiator, if the car stood still and only natural air circulation were depended upon. To reduce the radiator to a size that can be used, the relative efficiency is increased through an artificial flow of air. This is brought about in two ways. One is that the radiator does not stand still, but is moved with the car, which induces an air circulation. However, this would not be effective with the car standing still and the engine running, so a second artificial circulation is provided through a fan. This fan is driven from the engine and rotates when the engine rotates. If the engine runs slowly and has little heat to dispose, the fan runs slowly. Again, when the engine is running at its maximum speed, the fan, too, is making its highest possible number of revolutions. The fan serves the same purpose in an air cooling system, by forcing a draught of air over the cylinders in each revolution.

This fan is generally placed at the front of the motor and driven by belt from a

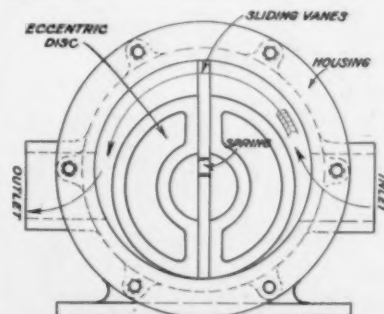


Fig. 11. Section of Sliding-Vane Type

The slot in the disc contains the two vanes, which are pressed apart by a flat spring. The vane action carries the water from the inlet to the outlet.

pulley mounted on the crank shaft, cam shaft, or accessory drive shaft, and draws air through the radiator, while in the air-cooled system it draws air through a screened opening at the front of the hood.

Some time ago there was a decided tendency to combine the fan with the flywheel, drawing air through the radiator and over the whole engine, thus effecting a secondary method of cooling. In some air-cooling systems the bonnets on the engine are provided with deflectors so as to direct the air currents to the rear cylinders, while one maker encloses the entire motor in a sheet steel housing, so the flywheel draws an equal amount of air over each cylinder.

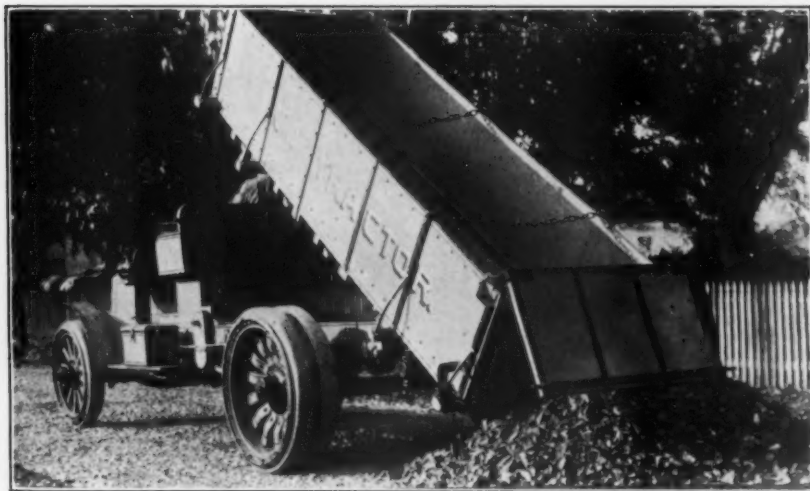
TRUCK SAVES \$50 A DAY ON ROAD CONSTRUCTION

A Peerless five-ton truck operated by James F. Nolen, a contractor of Germantown, a suburb of Philadelphia, is saving about \$50 a day on the cost of doing the same work with horses.

On a road construction job this contractor employs nine two-horse wagons to haul crushed rock. A 21 per cent. grade on the haul made it necessary to keep a driver and five extra horses to tow the loads up the grade. When the wagons were unloaded it required the services of four laborers with shovels to spread the material.

A Peerless five-ton screw power hoist truck was installed. From the beginning it hauled as much as nine wagons—98 tons per day. It climbed the 21 per cent. grade with capacity loads. By driving the truck slowly while the dumping mechanism worked, the truck itself spread the material on the roads. A little experience with the truck made it possible to haul 124 tons a day instead of 98—the work of twelve two-horse teams.

The contractor got rid of, therefore, twelve wagons, twenty-four horses, eleven drivers and in addition one driver and five horses on the steep grade. He also did away with the four laborers who formerly spread the rock on the road. He saved easily \$50 a day after paying the truck costs.



Spreading Crushed Rock With Peerless

The material is spread at the proper depth as it is dumped

TRACKLESS VEHICLES HAUL SIXTEEN TIMES VOLUME TRANSPORTED BY RAIL

"Few people realize the wonderful field that exists for the motor truck," says John N. Willys, president of the Willys-Overland Company, Toledo, Ohio, and maker of the Willys-Utility three-quarter-ton commercial vehicle. "The average man has no idea of how much horses-and-wagon hauling is done in this country. An estimate, based on recently collected government statistics, shows that merchandise transported by horse and wagon, motor truck, engines and other trackless vehicles, is

ness that even an average truck will do twice as much work as a horse and wagon can accomplish, and for less money. If ratio holds true in all the work of our commercial world, we have a golden opportunity to put the motor truck to work in earnest."

THE UNION TRANSFER COMPANY REPORTS UNUSUAL TIRE MILEAGE

The Union Transfer Company, which handles practically all the Pennsylvania Railroad Company's transfer business in



Peerless on Twenty-one Per Cent Grade

This five-ton machine takes its full load up this grade easily

sixteen times as great as that transported by railroads in a single year.

"Therefore, when one stops to think that it costs approximately \$2,000,000,000 to operate 250,000 miles of railroads in our country for a year, we get some conception of the opportunity for saving money by substituting power vehicles for horse-drawn trucks. It has been shown any number of times, in scores of lines of busi-

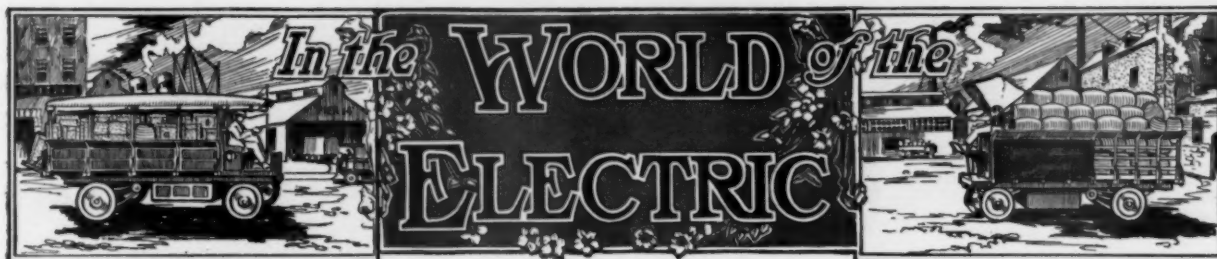
ness, Philadelphia, Baltimore and Washington, has solved the problem of getting the greatest possible mileage out of motor truck tires.

One conspicuous instance of unusual tire mileage on their trucks is a transfer truck equipped with Goodrich Wireless Motor Truck Tires. They began hauling baggage in June, 1911. After the truck went to work, the owners were able to forget there was such a thing as a motor truck tire to think about, because the tires on this truck never called for any attention until they had been in service nearly two years.

In January, 1913, the first replacement was necessary, when one rear tire which had run 12,900 miles was changed. In April following the other rear tire was taken off with 17,000 miles to its credit. The front tires continued in service until May and September of the same year, when they were removed, having run 18,800 and 25,300 miles respectively.

Since the rear tires were changed, the truck has run 12,000 miles, and the tires are good for more.

In speaking of this unusual record, Mr. Brose, the B. F. Goodrich representative in Philadelphia, said: "The secret of the whole matter lies right in the handling of the truck. It has been operated under good conditions, it is never overloaded and never overspeeded; the driver resists the temptation of using the car tracks as a speedway. Any motor truck in normal service handled as the Union Transfer trucks are handled should develop fully as satisfactory mileages."



Big Saving by Electric Tractor in Sawmill Work

Louisiana Lumber Firm Replaces Sixteen Mules and Fourteen Men With Three Electric Tractors, at a Saving of \$13,243 a Year

ELIZABETH, La., situated in the heart of that state's yellow pine forest, is not even a town, being only a lumber camp, but it contains one of the most up-to-date lumber mills in the South. Manager R. M. Hallawell and Electrical Engineer James Hill have made this an electrical plant throughout, and are firm believers in the "juice." If there is no electrical apparatus on the market to do their work, they either make it themselves or have some manufacturers build it for them.

The plant of the Industrial Lumber Company has a daily capacity of about 300,000 ft., which means that they must cut over about 20 acres of land per day. Six large freight engines and seventy-five flat cars are used to move the logs in from forest to mill. About 1000 hands are employed, nearly 50 per cent. of these being negroes. Efficiency is the watchword from the felling of the trees to the moving of the lumber in the yards by the new electric "mules." Even the bark and strippings from the sides of logs, which in most mills are carried to one end of the yard and burned, are shredded and placed in vats, where turpentine is extracted by steaming.

The trees are sawed down, cut in half and then pulled from the forest to the side of the track by a huge steam derrick, which can pull four logs from four different directions at the same time. From the side of the track the logs are loaded on the freight cars by a mechanical loader, which travels on the standard gage track; the train of loaded cars is then run back to the mill, where the logs roll by gravity

into the millpond. From here they are carried to the mill by an endless chain system.

About 25 per cent. of the mill's output goes to the timber docks, where it is shipped abroad or to American users requiring heavy timber. The dry kilns take about 15 per cent. One of the illustrations shows the lumber from the kiln being towed to the storage sheds at the other end of the yard. The balance of the lumber is piled on the stacks and put through

for something which would handle quickly from 2 to 4 tons of lumber, something which would load and unload very quickly, and yet be simple in operation and inexpensive to operate, at least from the standpoint of labor. Freedom from fire risk was also a consideration. The requirements were met by building a tractor of the following specifications:

Chassis rating, two-ton; battery, 44-17-G. V. lead; motor, G. E., 85 volts; con-



Electric Tractor in Sawmill Service—Towing to Storage Sheds

the planer. The moving of this lumber required about 20 mules and a corresponding number of men, and it was to displace these that the electric tractor was built.

The New G. V. Tractor

While the tractor in question was not exactly a new proposition for the General Vehicle Company, this is the first time, as far as known, that an electric tractor has been adapted to operating conditions of this kind. The general specifications called

troller, S-35; wheelbase, 54 ins.; frame, 4-in. rolled steel channel; wheels, artillery type on Timken bearings; tires—front, 28 by 4 ins., rear—28 by 3½ ins., dual; countershaft, housed type on Timken bearings; brakes, internal expansion on rear wheels; springs, half elliptic, front and rear.

As will be noted from the illustrations, the battery is mounted on the top of the chassis, the driver's seat is at the rear of the battery, the controller is at the driver's left hand, while the brake lever is operated by his right foot and the bell by his left foot. The cradle is supported by a steel extension from the chassis frame and rests on a substantial revolving block held to the supporting members by a king bolt which passes through.

The lumber is first loaded on the standard two-wheel lumber dolly and is connected to the tractor by backing the tractor under the load, a chain being thrown around the lumber back of the first crossbar on the dolly and in turn attached to the end of a cable which passes through a guide bolt near the king pin and around the drum of a standard hoist. The driver presses a lever on his left and the hoist



Electric Tractor in Sawmill Service—On the Tramways

operates the cable, which tightens the lumber to the dolly and holds it securely to the rear bolster.

In moving lumber from the mill to the lumber stacks the tractor has a capacity of seven and a half round trips (2400 ft. each) per hour, towing an average of 1500 ft. of lumber, or 3375 tons. In this work one tractor replaces five mules and three men.

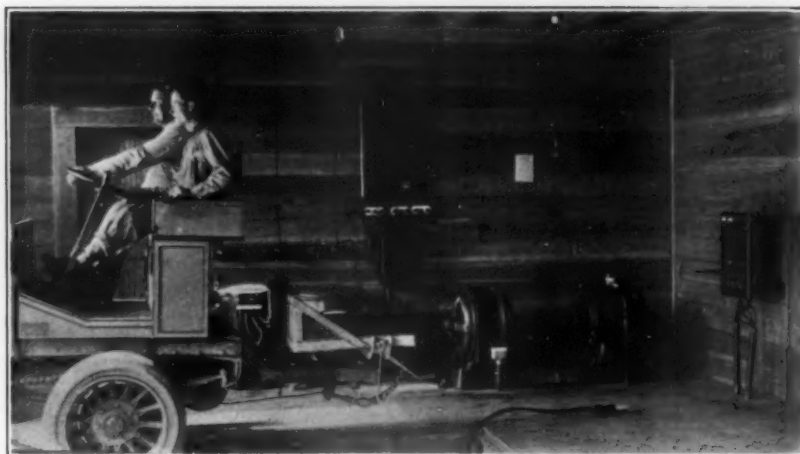
This big mill has about 5 miles of tramways, running from the mill to all parts of the different yards. Tramways are from 16 ft. to 20 ft. wide and are floored with 3-in. timber. At the mill the tramways are about 20 ft. from the ground, sloping to about 4 ft. at the opposite end of the yard. The tramway lumber is worth \$13 per thousand board ft. and costs \$5 per hundred for laying. These figures are important, as the mules' shoes necessitated the renewal of this lumber every three years at a cost of \$25,650. Obviously rubber tires will show a big saving in this item alone.

After the lumber is dried, it is moved from the lumber stacks and dry sheds to the planing machines and then loaded into freight cars, located from 60 to 1000 ft. away, either by hand or by the tractor. This work is considered very hard on the mules and difficult for the truck, as the hauls are very short and the roads tortuous. The truck has to go between the planers and in other narrow places and into the drying sheds, where it is necessary, sometimes, to back down a long narrow aisle. It is in this class of work that the tractor shows the largest saving, due to its flexibility of operation in the smaller spaces and the ability to load and unload quickly. In such work one tractor displaces seven mules and five men, making thirteen round trips per hour, with 1100 ft. of lumber per trip. The average distance covered per round trip is 2000 ft. In transferring lumber from the dry kiln to the dry sheds, one tractor will do in two hours work that usually takes two mules all day to do.

Cost of Operation

Three tractors and six men taking the place of sixteen mules and twenty men.

No current has been figured in the operating costs of the three tractors, as the amount used is not considered of any consequence. Assuming that a mill were to buy current from the central station at



Garage and Charging Equipment

4c per K. W. H., the cost would not average over \$200 per tractor, or \$600 in all.

Operating costs of tractors are given with G. V. conservatism, as the figures include battery, tire, gear and chain renewals each year. The load is towed, not carried, and this should favor tires and other parts which show rapid depreciation in heavy haulage.

From the above it will be seen how that one special application of the electric commercial vehicle has resulted in a substantial saving to the manufacturer in question.

E. V. A. SECURES SECRETARY

For some time past the E. V. A. has realized, that owing to its rapid expansion, and the multiplicity of detail connected with the association's efforts to promote the use of electric pleasure and commercial cars, it was necessary to have a salaried man for this purpose. Up to this time the work has been carried on by officers who have many times found it necessary to neglect their own personal business for the work of the association.

The E. V. A. now announces that it has secured the services of Mr. A. Jackson Marshall as its executive secretary. Mr. Marshall has until recently been identified with the lighting world, and is credited with originating much of the effective publicity now well known to the public as emanating from that industry. He is well

known in the central station field and has also been connected with the General Motors Truck Company, in charge of their business in Northern New Jersey.

Mr. Marshall will have his office at the headquarters of the Electric Vehicle Association of America, at the United Engineering Societies Building, 29 West 39th Street, New York City.

BATTERY-DRIVEN FIRE TRUCK SHOWS BIG SAVING

The cost of operating New York's only battery-driven fire engine, according to data recently compiled, has more than justified the substitution of this truck for the horse-drawn apparatus. Not only has a big saving been effected in cost, but the added advantage of much greater speed has been a source of great satisfaction.

The total cost of operating the truck, which is of the couple-gear type, over a period of one year is estimated at \$388.74. The following items are included:

| | |
|--|----------|
| Depreciation | \$200.00 |
| Current at 6 cents per kilowatt-hour | 117.90 |
| Distilled water, | |
| Sulphuric acid, | |
| Brushes for the motor and other | |
| minor repairs | 70.84 |

Total

A comparison of this with the cost of operating a horse-driven engine shows a saving of \$266.52 in favor of the battery-driven truck.

| | |
|----------------------------|----------|
| Horse-drawn truck | \$655.26 |
| Battery-driven truck | 387.74 |

Saving

During the year covered by the above costs, the battery-driven truck responded to three hundred and nineteen alarms. One run of 6 miles was made through the crowded city streets in 23 minutes, with the truck exceeding at times a speed of 20 m.p.h. The storage battery is a U-S-L, 80 cells, thin plate type.

Carl Electric Vehicle Company, Toledo, Ohio, has been formed with a capital of \$300,000 for the purpose of manufacturing both pleasure and commercial electric vehicles.

TABLE SHOWING COST OF OPERATION

| INVESTMENT. | | Mules. | Tractors. |
|---|--|----------|-----------|
| 16 mules at \$225 each | | \$3,600 | |
| 20 sets harness at \$25 each | | 500 | |
| 20 2-wheel dollies, with shafts, at \$25 each | | 500 | |
| 3 electric tractors with (G. V.) batteries at \$2,900 each | | | \$8,700 |
| Stable, grain, horse, blacksmith shop, etc. | | 3,000 | |
| Garage, charging apparatus, etc. | | | 1,000 |
| Total | | \$7,600 | \$9,700 |
| FIXED CHARGES. | | Mules. | Tractors. |
| Interest | | \$228 | \$291 |
| Depreciation | | 1,140 | 1,020 |
| Fire insurance | | 100 | 87 |
| Total fixed charges per year | | \$1,468 | \$1,398 |
| OPERATING COSTS. | | Mules. | Tractors. |
| Renewals of batteries (every year) | | | \$867 |
| Renewals of tires (every year) | | | 600 |
| Renewals of chains, gears, etc. | | | 375 |
| Feed, shoeing, stable help, etc., at \$20 per month per mule (16 mules) | | \$3,840 | |
| Labor | | 10,500 | 3,600 |
| Repairs to tramways | | 8,550 | 4,275 |
| Total operating costs per year | | \$22,890 | \$9,717 |
| Total costs per year | | \$24,358 | \$11,115 |
| Saving per year by using electric tractors | | | \$13,243 |

Storage Batteries*



ELECTRICITY, as we know it, is not stored. To this extent, the term "Storage battery" is a misnomer. A more correct designation is "secondary battery" or "accumulator." The latter word is used generally abroad. For simplicity, however, the more common term is given preference in this paper.

Storage battery theory is more a matter of chemistry than electricity. Those educated and trained in electricity should not ipso facto be expected to understand the subject without some training in chemistry.

The underlying principle which makes the device possible, is that of two exactly opposite chemical reactions which are also very nearly equal. It is because certain forms of lead, in conjunction with sulphuric acid, give reactions so nearly equal, that this particular metal and this conducting liquid are used. Other metals that give exactly opposite reactions are known but none that does not show much more loss between the two actions, has been discovered.

This paper treats almost exclusively of lead-acid type of battery, as it is the prevailing kind in use to-day. Only one other type has been at all successful; it will be mentioned later.

Cell Parts

There are three principal parts of a storage battery: positive plates, negative plates and dilute sulphuric acid. There are three secondary parts: separators, connecting-straps and containing-jars. These six parts when properly assembled make the storage battery unit called a Cell. Any number of cells constitute a Battery. A Battery is the unit of commerce and may cover any size, from one capable of delivering as little as $\frac{1}{4}$ of an ampere for 8 hours, up to one designed to deliver 15,000 or more amperes for 1 hour, and from 2 volts to 300 or more.

Plates

There is always an odd number of plates per cell. One more negative plate is used so that the two outside plates are negative. Separators are either wood or rubber and frequently both. Connecting-straps, or busbars, are usually of pure cast lead, molded for the particular shape desired. Connections between cells are made by "burning" or bolting the joints. The former is far preferable because of the corrosive effect of battery fumes on contact surfaces, which is always to be observed to a greater or less extent, even though the contacts be reasonably tight. Lead in itself is not the best of conductors and where conductivity is secured by contact alone, losses occur. Containing-jars can be of hard rubber, glass or lead-lined wood-tanks, as the service permits or demands. Other materials are unsuitable, because of either inability to withstand acid attack or poor durability.

For different classes of service, plates may be differently constructed. In this paper only those designed for vehicle or automobile service are considered. The foundation of a plate, whether positive or negative, is a cast framework called a Grid, composed of pure lead with a stiffening alloy of antimony. This is designed with a

view to (1) mechanical strength, (2) conductivity and (3) ability to properly retain the material with which the grid is filled. This latter is known as Active Material, a paste differently constituted for the two opposite plates. Positive plates are filled with a mixture of lead oxide, such as litharge, red lead, etc., and certain substances to give it proper body and cohesiveness. Negative plates are filled with a paste made of pure, spongy lead, a physical modification of metallic lead, also mixed with proper binding chemicals. The distinctive difference between the plates in appearance is that the positive has a reddish brown color and the negative a slate gray.

Electrolyte

Pure sulphuric acid, which has been so manufactured and refined as to eliminate any metals or salts, is diluted to approximately one third (by weight) of its original strength. This solution is called Electrolyte and is of equal importance in the storage battery to that of plates themselves. The most important consideration for electrolyte, both at the time it is first introduced into the cell and during the operation of the battery, is its density or specific gravity. This is determined, of course, by means of an hydrometer and the strength above mentioned shows approximately 1.300 by this means.

Action

The action of these three parts (positive plates, negative plates and dilute acid) is brought about electrolytically. Starting with the cell in a discharged condition, both plates are coated with lead sulphate. When the current of electricity is passed through the cell, positive-plate sulphate is changed to peroxide of lead and negative sulphate to pure, spongy lead. This action is called charging and, when completed, removes all sulphate from the plates by the electro-chemical process of converting it into other compounds. When a battery so charged has its external circuit closed either by connecting electrical devices in the circuit or by bringing the two poles in contact, the opposite action takes place and is known as Discharge. The peroxide on the positive plates and the lead on the negative plates both become coated with lead sulphate and thus the cycle is complete. Accompanying these changes of active material there is a proportional change in the specific gravity of the acid, which bears a direct relation to the state of charge and discharge. When current is passed into the cell, the specific gravity increases and when current is taken out, decreases.

For the purpose of this paper, nothing further need be stated about the theory of storage batteries, although it is an intensely interesting matter. For the benefit, however, of those who may be interested in the chemical action, the following equations are given.

Charge

At negative pole

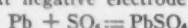


At positive pole

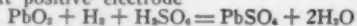


Discharge

At negative electrode



At positive electrode



Capacity

Storage batteries are manufactured and sold on the basis of their capacity, which is figured in terms of ampere-hours. Those familiar with electrical nomenclature need no further description, but for the benefit of others, it should be stated that "ampere" is an electrical unit of volume or quantity. This, multiplied by the time factor gives capacity; thus, a battery capable of delivering 7 amperes continuously for 5 hours has a capacity of 35 ampere-hours.

It is important here to bring out the fact that capacity as described above, is only a relative term. The example already cited of 35 ampere-hours needs to be qualified by "at the seven-ampere rate" or "at the five-hour rate." If more than 7 amperes be taken out continuously less ultimate capacity is obtained and if a lower rate of discharge be taken, greater ultimate capacity results; for example, the same cell discharged at 10 amperes would operate for 3 hours, giving only 30 ampere-hours, but if discharged at 5 amperes, would operate for 8 hours, giving 40 ampere-hours.

Voltage

Of equal importance with capacity is voltage. It may be said briefly, for those not already familiar with the term, that voltage represents pressure and is technically known as electromotive force; hence the common abbreviation E.M.F.

Every lead cell has a nominal voltage of 2.0. This is known as the open-circuit voltage. When a cell (or battery) is being neither charged nor being discharged—disconnected from either a source of current or a device for consuming power—it is in a state of "open circuit." The voltage at such times has no practical value whatever, contrary to the fairly general impression. The actual open-circuit voltage is, however, usually higher than 2.0, depending on acid density, temperature and state of charge or discharge.

This nominal voltage is valuable only in determining the number of cells required for use in connection with any given piece of apparatus. Cells are almost universally to-day connected in series; i.e., positive terminal to negative terminal, positive to negative, and so on indefinitely. So the number of cells used, times the nominal cell voltage (2), gives the battery voltage. Every lead cell, regardless of size, has the same voltage. Increase in size, either in number or size of plates, affects only the capacity. To increase the voltage, cells must be added.

If cells be connected to a charging source and current forced to flow in, the voltage will rise as shown by Fig. 3. When the circuit is first closed, the voltage rises immediately to about 2.15; there is then a more or less gradual rise (depending on the rate of charge) during a much longer period to 2.25 or 2.35. This is followed by a final rapid rise to approximately 2.6. If current still be allowed to flow in, the voltage remains practically constant.

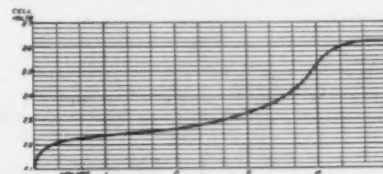


Fig. 1. Charging Voltage When Rate is Constant

*Extracts from paper presented by W. H. Conant before the Annual Meeting of the Society of Automobile Engineers, January 6, 1914.

Here must be considered a phenomenon of the accumulator. As soon as the charging source is disconnected, cell voltage immediately starts to decrease and in time will return to almost its original state. This is called Recovery, which when properly understood explains some of the perplexing features of battery care.

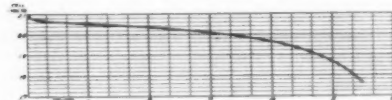


Fig. 2. Discharging Voltage When Rate is Constant

If, now, the charged cell be connected to any device which consumes current, the voltage will diminish as shown in Fig. 2. The first short drop is a quick one to, say, 2.05; then, during a considerable period, the drop is much more gradual; when about three-quarters of the capacity is given up, the voltage begins to drop off rapidly and soon ceases to be useful. Again the phenomenon of Recovery is apparent; cell voltage begins to rise as soon as open-circuit conditions are present and normal voltage is soon evident.

The reasons for this series of actions are both chemical and physical but too involved for discussion here. Fig. 3 will serve to show graphically the course of cell voltage during a cycle that is easily followed from left to right. For one hour open-circuit is indicated: discharge at 140 amperes is then taken for a similar period and open-circuit conditions again restored. When the voltage has recovered to a point corresponding with the electrolyte density and remained constant for some time, a

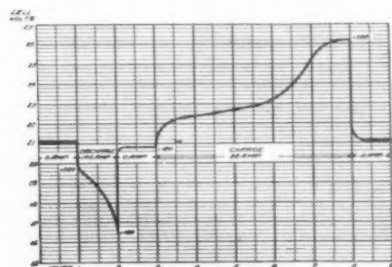


Fig. 3. Course of Cell Voltage During One Complete Cycle

charge is started at 35 amperes and maintained for 5 hours. After another period of open-circuit, the cell voltage is found just where it started.

Cadmium

Aside from cell or terminal voltage, there is frequent occasion to consider positive and negative voltages separately. These are observed by means of a neutral electrode, usually Cadmium. A piece of this metal is dipped into the electrolyte and a voltage reading taken to the positive and to the negative group. On discharge, positive-cadmium voltage is always higher than that of the cell. Cell voltage on discharge, then, is the difference between the two cadmium readings. Fig. 4 illustrates positive-cadmium, positive-negative (or cell) and negative-cadmium voltages respectively, when the cell is discharging.

At the beginning of charge, negative-cadmium voltage reads in the same direction as cell and positive-cadmium; during the course of charging, this reading becomes neutral and then minus. Cell voltages on charge is still the difference, although an algebraic one, between positive-cadmium and negative-cadmium voltage.

Fig. 5 serves to illustrate an example of positive-cadmium, positive-negative, and negative-cadmium voltages respectively, when the cell is charging.

The relation is expressed thus:

$$C = P - N^*$$

Where C = Cell Voltage.

P = Positive-cadmium voltage.

N = Negative-cadmium voltage.

*When N has a minus value, $C = P - (-N)$ or $C = P + N$.

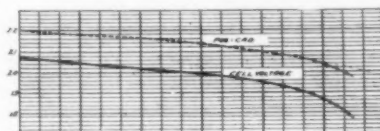


Fig. 4. Cell and Cadmium Discharge Voltages

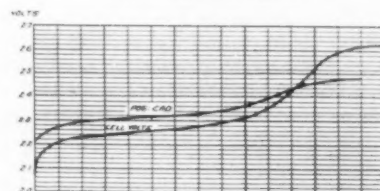


Fig. 5. Cell and Cadmium Discharge Voltages

Relation of Capacity and Voltage

Now that capacity and voltage have been touched upon, it is important to note their relation or inter-dependence. That which determines the capacity of a storage battery, is the time during which it will maintain a useful voltage. This time, in turn, is affected by the rapidity with which the capacity is drawn upon. Finally, the low limit of useful voltage varies with the time in which the capacity is to be consumed. Fig. 6 shows voltage curves for

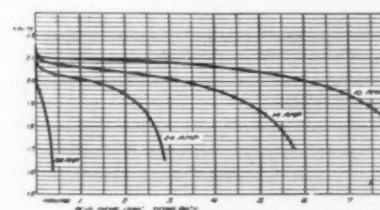


Fig. 6. Voltage Effects From Different Discharge Rates

the same cell at different rates of discharge. For small current draw, such as lighting motor cars, cells are considered discharged when a voltage of 1.8 is reached; for heavier current consumption, as in electric vehicle propulsion when 1.7 is indicated; and for high rates used in cranking engines 1.65. (The 1.8 and 1.65 figures are recommended to the Society for practice; all three constitute accepted practice in the storage battery industry.)

The inter-relation can, perhaps, be better understood by reference to Fig. 7. A cell

is discharged for one minute at a high rate, corresponding, for example, to the energy required to start an engine. The voltage drops rapidly. The rate is then decreased to one-third of the initial, for a period of

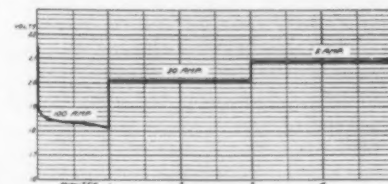


Fig. 7. Voltage Recovery From Decreasing Discharge Rate

three minutes, as might be required of a battery for turning an engine over on a cold day. It will be noted that the cell voltage recovers to nearly that corresponding with the normal point for that rate, so that the cell now appears to have more remaining capacity than before. With the rate again reduced to one corresponding with that required for lighting purposes only, it will be noticed that the cell voltage again recovers and the discharge proceeds somewhat as though it had been at the low rate throughout its course.

Efficiency

Losses in the storage battery are due chiefly to the differences in potential between charge and discharge voltages, as may be seen from Fig. 8. Almost from the outset, there is a difference of 0.25 volt per cell, which increases as the curves diverge, until it reaches 0.5 or more. One charge and one discharge, regardless of length, constitute a cycle. If short cycles be taken at low rates, the differences in voltage will be small and the efficiency thereby increased; the longer the cycles and the higher the rates, the lower the efficiency will be.

The other loss which goes to make up the total is that due to the longer time required for charging as compared with dis-

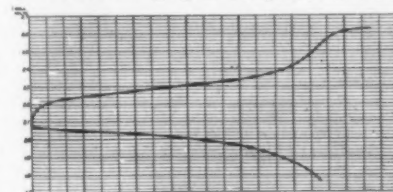


Fig. 8. Difference Between Charging and Discharging Voltages

charging. This loss is much smaller and, if it were the only one to contend with, would permit of interesting results. Ampere-hour efficiency varies from 87 to 93 per cent. and in some cases runs as high as 95 per cent. Watt-hour efficiency, however, varies from 60 to 80 per cent. and represents the real value of storage batteries. Fig. 9 shows a test which gave an ampere-hour efficiency of 93.5 per cent. and a watt-hour efficiency of 79.3 per cent.

It should be noted that under operating conditions now found in gasoline cars, high efficiencies are not only possible but probable. Batteries here have two functions: supplying instant power at any time for cranking or other purposes, when no other source of energy can be drawn upon, and maintaining uniform voltage for lamps and other devices, when the generator is furnishing current intermittently at varying voltage. As a usual thing, therefore, no great amount of current is withdrawn, which means short cycles and high efficiency.

The foregoing must not be taken to mean that comparatively small batteries are just as satisfactory for this work as larger ones; indeed, quite the contrary is true. Capacity required for cranking the engine is sometimes very considerable—more so, of course, in cold weather when the battery gives its poorer output—and should be largely the determining factor for size.

Temperature

The effect of temperature on battery action is very marked. High surrounding temperature during discharge makes for greater capacity than low temperature, even with the same quantity of charge. Warm batteries are, therefore, more efficient than cold. An interesting situation occurs in the case of a battery charged in a cold place and discharged in a warm one, for it is entirely possible to obtain a greater output than the previous input.

For the acid densities employed in storage cells, temperature increases on charge and decreases on discharge. The latter statement must be qualified by saying "at normal rates"; if a cell be discharged abnormally, the temperature will rise, and at extremely high rates, very rapidly. Suffice it to say that there are both chemical and physical reasons for this action.

No permanent damage is done to batteries by low temperatures. Solutions of the specific gravity in question will not freeze in any weather we experience. It might be well to qualify this statement to include only charged batteries, which would require temperatures ranging from 30 degrees to 95 degrees F. to freeze. Discharged batteries, or those which may have been considerably diluted, will freeze at acid and over-discharge are the three points corresponding to their proportion general way that high temperature, strong of water. A solution measuring 1.125 will freeze at about 10 degrees F.

Damage frequently results, however, from high temperature. This is probably the greatest single cause of trouble in storage battery practice. It may be said in a capital enemies of accumulators, and rank in importance in the order as given. Lead is not soluble in dilute, cool sulphuric acid, but in either strong or warm acid is attacked. Both plates are susceptible to warm acid and are injured by high battery temperatures. It is well to keep the electrolyte always below 100 degrees F., but as this is frequently impossible in summer weather, 105 degrees F. has been set as the safe maximum by manufacturers of batteries.

Internal Resistance

The matter of internal resistance is one that needs be given no consideration by those for whom this paper is intended. This factor is a known quantity of negligible amount, compared with other more important features of battery practice. It amounts, roughly, to 0.03 ohm for small cells, varying with the plate area exposed and the separation.

Manufacture

At some future time, large buyers of batteries will subject the constituent plates to as careful scrutiny and analysis as they do now metals for mechanical parts of motor cars. The differences between good plates and others begin in the earliest stages of their manufacture. All grades of lead oxides may be used where quality is not the desired end; careless work may be done in the molding of grids; poor contact may be established in filling grids with paste; hurried processes may be tolerated when "forming" the grids thus pasted into finished plates; and many other corners

may be cut that will not show until long after the batteries are placed in service. Even then it requires the chemist or expert to trace back from effect to cause, so involved are some of the resulting chains of action. Considerable space has been given to the matter of cadmium readings in order that engineers may be better informed with a view to distinguishing between good and poor positive plates and between similar negatives. Tests of this character will show which manufacturer is making the two plates of corresponding capacity and life, or which is making one too good for the other.

Under the paragraph on Electrolyte, mention is made of the fact that this is equal in importance to either positive or negative plates. Too much stress cannot be laid upon this feature. The general impression that capacity is dependent directly on plate surface is only relatively true; increase in quantity, circulation or diffusion of acid will in itself add materially to capacity, up to certain reasonable limits, without any other change in a cell.

For a given size jar there is a limit beyond which the number of plates should not go, on account of the necessary num-

factors in capacity—plate surface—is increased, another equally important one is decreased. If the comparison be carried out to include fifteen and seventeen plates in this same jar, it is evident that the curtailment of electrolyte becomes more serious. To offset this decrease of acid volume, recourse must be had to higher specific gravity, which is detrimental to battery life because of the solubility of lead in dense electrolyte. The smaller quantity, furthermore, results in higher cell temperature, which likewise curtails effective life.

Wood separators as used in batteries to-day have but a limited life because of their texture and thinness. Both of these features are necessary evils from the limitations of space and the characteristics of the wood itself. From the action of heat and time, the wood chars or loses its mechanical strength and, therefore, should always be supplemented with perforated hard rubber sheets of small gage.

RAILROAD USES TRUCKS ON CONSOLIDATED FREIGHT

How to best handle "transfer freight" coming to the Boston station of the New York, New Haven & Hartford Railroad, has long caused the terminal managers much cogitation. Much freight comes in from the nearby stations and has to be moved from the company's inbound houses to its outbound houses for loading to destination. During the past year considerable experimenting has been done with gasoline and electric trucks, and as a result the railroad company has recently purchased two General Vehicle electric machines of 5 tons' capacity to be used in this work.

Previous to the installation of these trucks they were using about thirty-seven freight cars at a per diem expense of 45 cents each, this class of freight running between 70 and 100 tons daily. They now use two or three of these cars. These trucks go between houses that are from $\frac{1}{4}$ to $\frac{3}{4}$ of a mile apart.

Under this method a day's delay to the freight is saved and also some operating expense. Each truck has a driver, checker and three freight handlers, and handles from 30 to 45 tons per day, with a mileage per truck of 12. Trucks have a clear loading space of 6 x 15 ft. with stakes, side opening, high seat and three bow hoods, Edison batteries; with the above loading space on their mixed freight they carry from 9200 to 10,000 lbs. conveniently. They are to garage and care for these trucks themselves, also charge from their own plant.

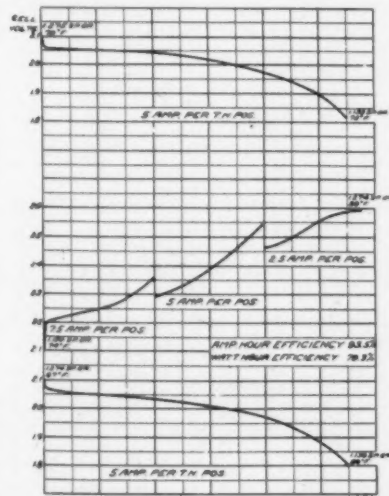
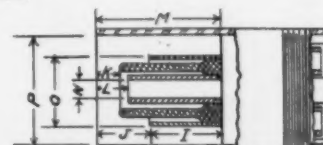
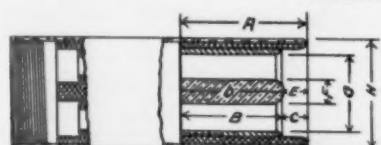


Fig. 9. Efficiency Test of T. H. Gould Cell

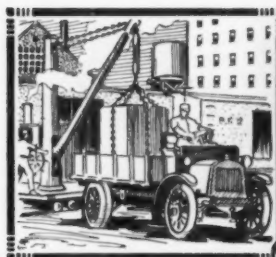
ber of separators, which are dead material. If, for example, a cell of given size be filled with eleven plates, ten separators are necessary; if thirteen thinner plates be substituted in this same cell to gain capacity, twelve separators are required. Two additional thickness of dead material, therefore, displace part of their bulk in acid; furthermore, the displacement of the thirteen thinner plates is slightly greater than that of the ten thicker ones. The result is that although one of the important



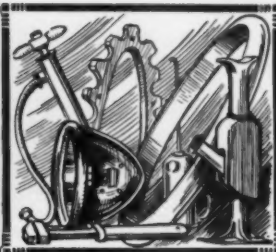
| CAPACITY | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P |
|----------|-------|-------|-------|-------|------|------|-------|------|-------|-------|-------|------|------|-------|-----|-----|
| 50 AMP | 1 1/8 | 1 1/8 | 3/8 | 1 1/8 | 5/16 | .375 | 1.125 | .375 | 1.125 | 1 1/8 | 7/8 | 3/8 | 3/8 | 2 | 375 | 360 |
| 150 AMP | 2 1/8 | 1 1/8 | 1 1/8 | 2 1/8 | 5/16 | .437 | 1.406 | .437 | 1.406 | 1 1/8 | 1 1/8 | 5/16 | 5/16 | 2 3/8 | 437 | 422 |

Standard Charging Plug Adopted by the Electric Vehicle Association of America

Showing drawing and dimensions for both 50 and 150 ampere size. Outside contact is positive and inside contact negative.



TRUCK ACCESSORIES AND APPLIANCES



THE BOCK ROLLER BEARING— ESPECIALLY SUITABLE FOR TRUCKS

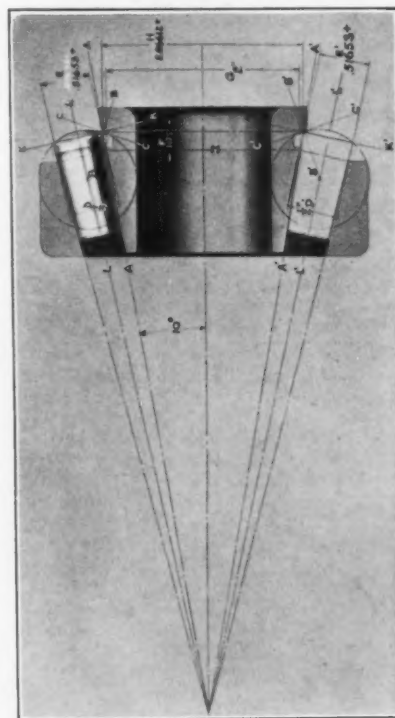
The Bock Bearing Company of Toledo, Ohio, has brought out a new form of bearing particularly suitable for truck use, and claimed to be theoretically and practically far in advance of any bearing design in use at the present time. The constructional details and design have been worked out to a very fine point and wonderful results have been obtained. This bearing is constructed on the cone segment idea and the object has been to eliminate any slippage of one part of the bearing over another; in other words to produce a perfect rolling movement of all parts which, as is well known, reduces friction to a minimum. The design of this bearing has also eliminated the wedging action, which has caused much trouble in the past.

In order to obtain this result it was necessary to work to a design similar to the diagram shown herewith. This is a section through the Bock bearing, the cage being

omitted, and dimensions given. This illustrates clearly the principles involved. In it we have a cone, a roller and a cup the same dimensions. Line A' A' on lower half of bearing, is the face of roller and cone. The roller is projected beyond to line M, (the base of cone), to a line K' K'. Line C' C' intersects at the same point, this being the exact rolling point of the roller and the point where bearings of this type should take thrust loads. This fact is proved by multiplying the dimension G, which is 2 in. (base of cone), by 3.1416 which equals 6.2832 in., circumference of cone at this point. At this point dimension D is $\frac{1}{2}$ in.; $\frac{1}{2}$ in. x 3.1416 equals 1.5708 in., lineal travel of roller in one revolution. The large circumference of the cone 6.2832 in., divided by 1.5708 in. (the travel of the roller), makes the ratio exactly 4 to 1. Dimension H, 2.06612 in. is the diameter of the cone flange at the contact point of the projected roller. This diameter, multiplied by 3.1416 in. equals 6.4909 in., lineal travel of cone at this point. Dimension E, .51653 in. is the diameter of the extended portion

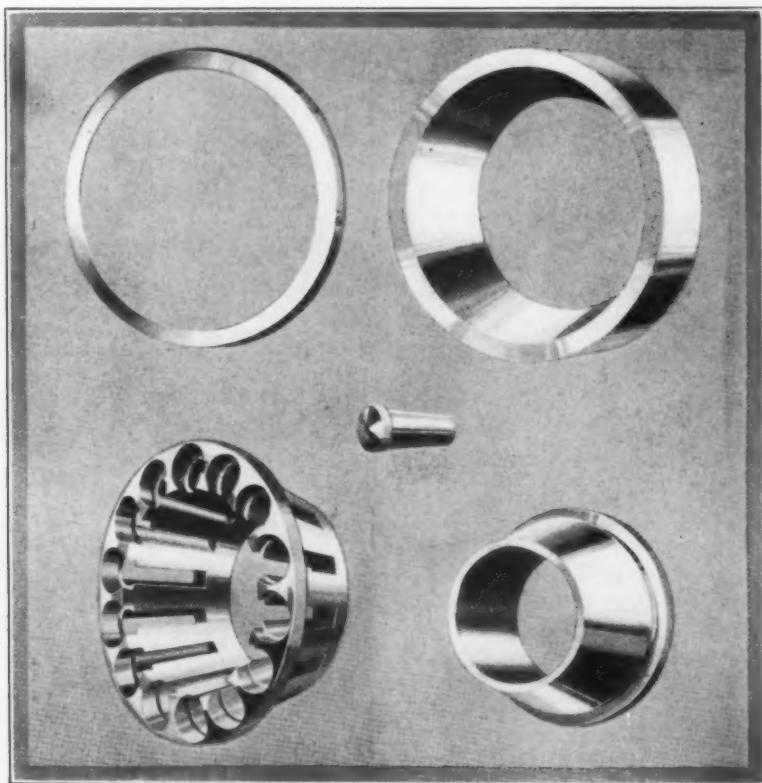
of roller at its point of contact with cone flange. To get the travel of the roller at this point multiply .51653 in. by 3.1416, which equals 1.6227 in., the circumference. Dividing 6.4909 in. (the travel of the extended cone of roller at the point of contact with the cone flange), by 1.6227 in. we again get a ratio of 4 to 1.

It is evident that a bearing of this character should take thrust exactly at the point



Bock Bearing Diagram

Showing how the sides of the roller cones and caps meet at a common point, giving a perfect rolling motion without slippage.



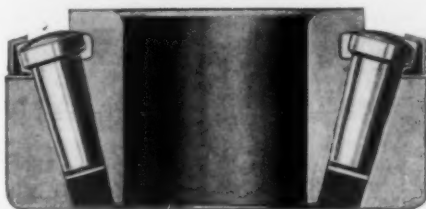
The Bock Bearing Disassembled

Showing the retainer at the upper left, and the cup at the upper right, while below are the cage and the cone. The roller is in the center

of contact of the projected roller and cone flange, as any deviation will result in considerable slippage, as previously described. It is a known fact that loads cannot be carried at speed on a point or knife edge without rapid wearing or crumbling, as shown in lower half of figure 7. By looking at the upper part of cut, it will be seen at a glance that a perfect ball end has been provided, whose radial line B B, passing through center of ball, intersects lines A A and K K; line C C also intersects at the same point. Line C C is always at right angles to the line B B. Line K K is the surface on which ball end of roller comes in contact with flange of cone.

It will be seen therefore that the Bock people have certainly gone a long way toward the perfection of this type of bearing. It will not only withstand radial loads, but end thrusts as well and by virtue of its construction can be made up to a very close fit on relative gear carrying shafts and still revolve quite freely and with a minimum of friction.

In every department of The Bock Bearing Company "quality" is the watchword. The president, general manager, factory and



A Cross Section of the New Bearing With the Cage Omitted

The sides of the roller are not parallel, but converge to a common point, as shown in the diagram.

sales manager, have had long and practical experience in the service of the largest and most representative manufacturing companies in the world, in their respective lines. High quality of workmanship and product is a hobby with them, and they personally see that only the most modern machinery is installed in the plant, that only the most competent workmen are employed, and that all raw material is the best that can be bought. These precautions result in a product of a decidedly superior type.

The officers of the company are W. E. Bock, president and general manager; A. M. Donovan, secretary and treasurer, and A. J. Strong, factory and sales manager. The directors include the above officers, W. H. Jeffrey and K. N. Hardee. The authorized capital of the concern is \$375,000, of which \$325,000 is paid up.

THE VALENTINE POSITIVE DRIVE

This device, to give a positive drive under all traction conditions, is a substitute for the differential gear of any type and is the outcome of two years' experimenting and testing.

It consists primarily of a driving member A in two halves—formed like the cage of the conventional differential—to which the bevel or worm driving gear is attached in the usual manner, hence it will go in any axle, jack shaft or transmission without any change of housing or fittings. As shown in Fig. 1, this driving member has a dividing wall B with lateral projecting cams CC, driven drums DD in which the axle shafts are rigidly fixed and engaging means between the cams and drums, as shown in detail in Figs. 2 and 3.

The device is made in two types—type A, Fig. 3, for cyclecars, light pleasure and commercial cars; type B, Fig. 2, for heavy duty in larger cars, trucks, tractors, etc. Figs. 2 and 3 are views of one side with axle section of drums removed. In type A, Fig. 3, the engagement between the driving cam C and driven drum D is by means of rollers EEEE, shown in locking engage-

ment. A cage or carrier F, shown with top cut away, by frictional engagement with inside rim of drum insures all four rollers acting simultaneously. On going around a curve the outer wheel moving faster releases the rollers, which drop to a neutral position until said wheel resumes the same rate of speed as the inner wheel, when rollers immediately come into driving engagement again. By means of shifting pins GG—made of interlocking segments—working loosely through slots in driving member B and having connection with carrier F by lost motion—over-running is absolutely prevented, as the rollers can only travel to the neutral position through carrier coming in contact with opposite side of pin, the pin being held rigid by contact with carrier on the then driving side. In reversing car all movements are the same.

In the heavy duty type, Fig. 2, friction segments H are interposed between the rollers and drums, shown here in neutral position. In this type no carrier is used, the friction segments acting in place of same, being in frictional contact with drums D. The engaging faces of the segments are grooved spirally to take care of the lubricant and to give perfect engagement. This is a very powerful roller clutch, said to be perfect in engaging and releasing. From description of type A the action of this type will be readily understood.

The claimed advantages are that the wheel having traction is always positively driven, and skidding is reduced to a minimum, with no necessity for chains. No racing of motor or stalling of car through one wheel slipping. Saving in tire wear generally—in case of a deflated tire no power is applied to that wheel. Saving in power at all times—no waste or increase in power consumption on curves; should inner or driving wheel slip 1-in. outer wheel comes into driving engagement. The loss in engine efficiency is reduced fully one-half, and in a larger ratio where the condi-

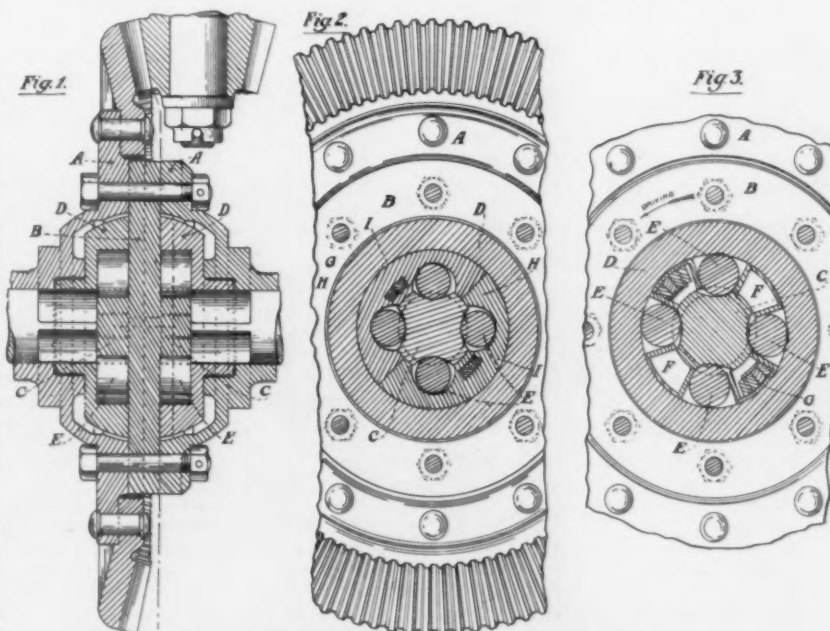
tions are more unfavorable. Braking is equal on both wheels—whether by engine, transmission brake or hub brakes. Absolutely noiseless, simple and durable—wear a minimum. In event of wear after long usage every working part is reversible as well as interchangeable.

The cam member, drums and friction segments are made high grade chrome vanadium steel scientifically heat treated, giving a surface of the utmost hardness with an exceedingly tough core. The rollers are made from a special bearing steel of great strength and hardness. These parts are carefully ground to exact size. The carriers and pins are made of high grade steel stampings.

The principles of either of the above types applied to a single clutch are specially adapted to self-starters—giving unusual evenness of engagement, strength and freedom from wear. This drive is being manufactured by John Valentine, 236 S. La Salle Street, Chicago, Ill.

PYRENE RECOGNIZED FOR AUTOS

Announcement was made last month by the Aetna Accident and Liability Company and the Automobile Insurance Company, of Hartford, Conn., that these companies would allow a discount of 15 per cent. in the fire insurance rate on automobiles suitably equipped with Pyrene fire extinguishers. This action was followed almost immediately by the Automobile Underwriters Conference, representing the companies writing this risk in the Eastern States. Shortly thereafter, the Western Automobile Conference announced the same reduction. Practically every company in the United States, writing automobile insurance, now allows this 15-per cent. reduction in rate, if the car owner takes the precaution of equipping his car with a Pyrene fire extinguisher.



Sectional Side Views of the Valentine Positive Drive
Fig. 2 is the type for heavy trucks. Fig. 3 is the one for lighter machines

NEW MOTOR BY WAUKESHA, FOR TRUCKS UP TO THREE TONS

The Waukesha Motor Company, Waukesha, Wis., is introducing a $3\frac{3}{4} \times 5\frac{3}{4}$ -in. motor, suitable for trucks up to 3-ton capacity. Following this company's heavy duty practice this motor has long bearings and large area; chrome nickel steel crank shaft; small bore and long stroke; "Waukesha" patented non-hunting and self-lubricating governor; great accessibility to all parts; such disposition of the charge as to give great economy of performance.

Cylinders and pistons and rings are of semi-steel mixture of very close grain. The cylinders are annealed and have the following boring operations. Rough finish, reamed and ground, cylinder is seasoned

follows: Front main bearing, 2 in. \times $2\frac{3}{4}$ in.; center main bearing, 2 in. \times $3\frac{1}{4}$ in.; flywheel end bearing, 2 in. \times $3\frac{3}{4}$ in.; crank pin bearing, 2 in. \times $2\frac{1}{2}$ in.

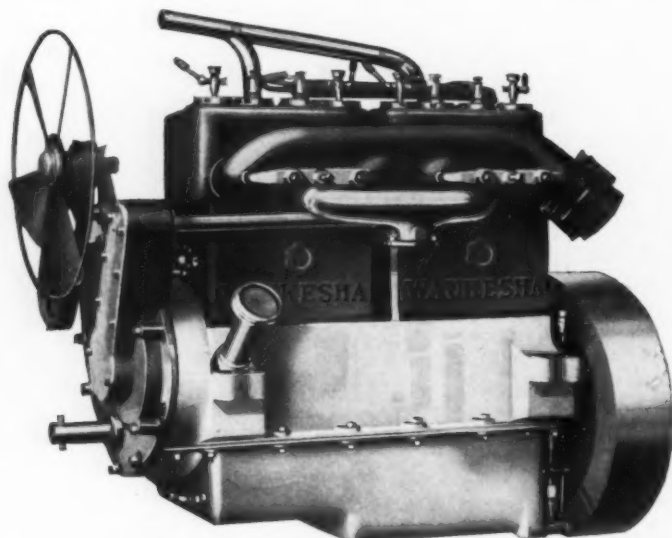
Crank shaft connects to flywheel by means of a liberal flange and six $\frac{1}{2}$ -in. bolts. Crank case is of aluminum alloy, very heavy and ribbed in the highly stressed sections. Timing gears are helical, 1-in. face, 10 pitch and drop forged, heat treated, 40 carbon steel, with large supporting bearings. Cam shaft is drop forged, 20 carbon steel with integral cams, which are ground to a master shaft. The shaft is case hardened all over. The push rods are of roller type, $1\frac{1}{8}$ in. diameter and bored out to a 1-16 in. shell, case hardened and ground. The pin is tool steel and roller case hardened and ground as is also the adjusting screw, which

together and insures simultaneous action of all parts which together with the dash pot cuts out all hunting. Combined with these features is the feature that the wear of the governor parts slows up the motor. The speed of the governor easily can be adjusted and sealed. All parts are entirely closed and all wearing parts are lubricated by the oiling system of the motor. The governor can be used as a maximum speed governor or for handling a load. In harmony with the governor are the power characteristics of the motor, which develops its rated torque at 600 r.p.m.

Covering a period of many months, three of these motors in 2-ton trucks have developed and maintained an average of over eight miles per gallon of gasoline or a total of over 60 ton miles per gallon of gasoline.

This can be furnished in unit power plant form or individual motor and can be furnished in the following sizes: $3\frac{3}{4} \times 5$; $4\frac{1}{4} \times 5\frac{3}{4}$; $4\frac{1}{4} \times 6\frac{3}{4}$; $4\frac{1}{2} \times 6\frac{3}{4}$; $4\frac{3}{4} \times 6\frac{3}{4}$.

These models are for trucks, industrial and heavy duty service only.



Waukesha Motor For Trucks Up to Three Tons

thoroughly before the grinding. Cylinder is tested five times during manufacture for imperfections. The piston has two rings of special design, are relieved in center and has three oil grooves on the skirts. Piston lugs are bushed to take wear of piston pin, which has a total bearing area of $2\frac{1}{2}$ sq. in. The piston pin is chrome nickel steel, case hardened and ground and has a 5-32-in. wall.

The connecting rod is drop forged, 40 carbon steel, heat treated, having a split clamp upper and four bolt crank pin end. The bolts are $7/16$ in. diameter of chrome nickel steel, heat treated, with a special castle nut for effective adjustment. The bearings are held in position by brass taper head screws and keyed on by heavy shims, proper adjustment being provided by thinner shims. The rod is reinforced to obtain great rigidity at the large end.

The connecting rod bearings are special design Fahrig metal bearing material with special reinforced backs to give great strength against distortion.

The crank shaft is of chrome nickel steel, heat treated, having a tensile strength of 140,000 lbs. and an elastic limit of 122,000 lbs. per square inch and a Shore hardness of 40-50. The shaft is so hard that it will not scratch and cut under severe conditions. The crank shaft bearings have dimension as

is locked by a soft steel nut. The rollers and pins are replaceable. The push rod guide is of semi-steel, carefully reamed and oil-grooved, having a total bearing area on the push rod body of $3\frac{1}{4}$ sq. in.

Valves are alloy steel head and hardened end and are provided with a long shallow recess into which taper washers fit and lock the spring clip in position. The valve is provided with a very large fillet which gives easy passage to the gases.

Lubricating system is a special splash and force feed type. Oil is forced to all bearings of the timing gears and caught by splash in pockets which feed main bearings and cam shaft bearings. Oil is fed into the four connecting rod pockets which are very deep without overflows. The connecting rods have scoops which dip deep into the oil pockets and splash oil out into the oil sump, main bearings and cylinders. With this system the out-going splash capacity of the connecting rods just equals the in-coming capacity of the oil ducts. The automatic feature insures the correct amount of oil at all times and also means correct level of oil for rods at any angle a truck can operate. The lubricating system consists of a geared oil pump and one oil pipe.

The governor consists of a fly ball governor so designed that the spring which sets the speed, also binds all the moving parts

GREATER VARIETY IN TORBENSEN REAR AXLES

Torbensen Gear & Axle Company, 216-224 High Street, Newark, N. J., manufacturers of the well-known Internal Gear Rear Axle, this year will produce that axle in four sizes suitable for use on 1500-lb., 1, $1\frac{1}{2}$ and 2-ton cars. This company will also put out an axle suitable for electric cars with 12 to 1 reduction. This axle in other respects is identical with the gasoline type.

TAB ON PATCH FACILITATES HANDLING

Not being able to improve the qualities of cementless tube patches, the Firestone Tire and Rubber Company, of Akron, Ohio, improved the construction of the same thereby saving time, annoyance and money. Formerly many patches were ruined in the effort to remove the glazed muslin with which the patches were lined. There was no way by which it might be gripped and taken off. Now, however, a thumb tab, part of the lining, extends beyond the circumference of the rubber. With one operation the muslin can be removed and the patch is ready for use.



Thumb Tab on Firestone Patch

THE FALLS MACHINE COMPANY BRINGS OUT NEW MOTOR

The Falls Machine Company, Sheboygan Falls, Wis., has brought out a new motor, model F, of the small bore, long stroke type, which although not showing any radical departure in design, possesses several features.

One of these features is the push rod design. The push rod guides are in two groups of four each, secured in place to two bosses on the cylinder block. The outside wall of these guides is a removable plate, shimmed, so that any side wear is easily taken up. By loosening but two cap screws, either group of the push rod guides, with the push rods in them, can be lifted out for adjustment without disturbing any other parts of the motor. The push rods themselves are square, of steel, hardened, and are drilled out to extreme lightness. The push rod space is enclosed, and provision is made for lubrication of the push rods, springs, and valve stems by splash from the crank case.

Another feature is that this motor can accommodate any of the standard makes of self starting motor-generators, these to drive the crank shaft through silent chain enclosed in a housing forming part of the timing gear cover.

In general design this motor is a four-cylinder enbloc "L" head job furnished in either unit power plant or regular type, for pump or thermo-siphon cooling, and with three-point suspension standard. It is built in three sizes, namely, 3½-in., 3¾-in. and 4-in. bore; stroke in all cases being 5 in. A three-bearing, nickel-steel, heat-treated crank shaft, 1¾ in. in diameter at the bearings and pins, is used. The crank shaft bearings are die cast of S. A. E. formula babbit metal of lengths as follows: front 3½ in., center 2¼ in., rear 4 3/16 in. The cam shaft is also a drop forging having the cams integral. It rides on three die cast bearings and has end thrust provision. Valves are 1 13/16 in. in diameter and have

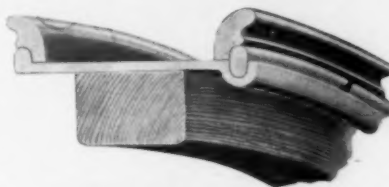
cast iron heads electrically welded to carbon steel stems. Pistons are gray iron, very light, and fitted with three rings each. Lubrication is by the force feed constant level splash system, in which all oil is strained before being re-pumped.

GOODYEAR ANNOUNCES NEW RIM

The Goodyear Tire & Rubber Company announces that after more than a year of testing and experimenting with various types of rims, it is prepared to supply especially light, strong, effective, quick detachable or demountable rims for No-Rim-Cut Tires, and all standard types other than Clincher Tires.



Goodyear No-Rim-Cut Detachable Rim



Goodyear Ideal Detachable Rim

Both these rims are also supplied in Quick-Detachable Demountable form

The new rim is made in the old Goodyear '07 profile, permitting the tires to widen out at the base and rest in their natural positions, providing greater air space and consequently greater carrying capacity and increased mileage. Less strain attacks

the side walls because the tire beads are not pinched together. This prevents tires "breaking above the bead." In the new rim, the flanges are high enough and have a proper contour to give necessary support to a No-Rim-Cut or a Straight Side tire. Four styles in the new rim are now offered in all quantities by the Goodyear Company, —the No-Rim-Cut Detachable, the Ideal Detachable, the No-Rim-Cut Detachable Demountable, and the Ideal Detachable Demountable.

The No-Rim-Cut Detachable is a light, two-piece quick detachable rim. It is much lighter than present practice. It is simple in operation and the outside flange answers the purpose of a combination side ring and locking ring. It is supplied also in demountable form.

The Ideal Detachable is identical with the Goodyear '07 rim. Its side rings are supplied either for Clincher or No-Rim-Cut Tires as desired. It is heavier than the two-piece rim and suitable for heavy cars. This rim also is supplied with demountable attachment when desired.

All Goodyear Demountable Rims fit standard Firestone and Kelsey fellow bands.

A DEVICE WHICH PREVENTS SPRING BREAKAGE

The operation of a commercial truck is of such a nature that it is not surprising in the light of overload, poorly distributed load, rush delivery, traffic conditions and bad road conditions, that the most careful driver will occasionally break a spring.

The situation is doubly exasperating, inasmuch as it not only represents the cost of repair, but the lost time as well and accompanying delay incurred while the



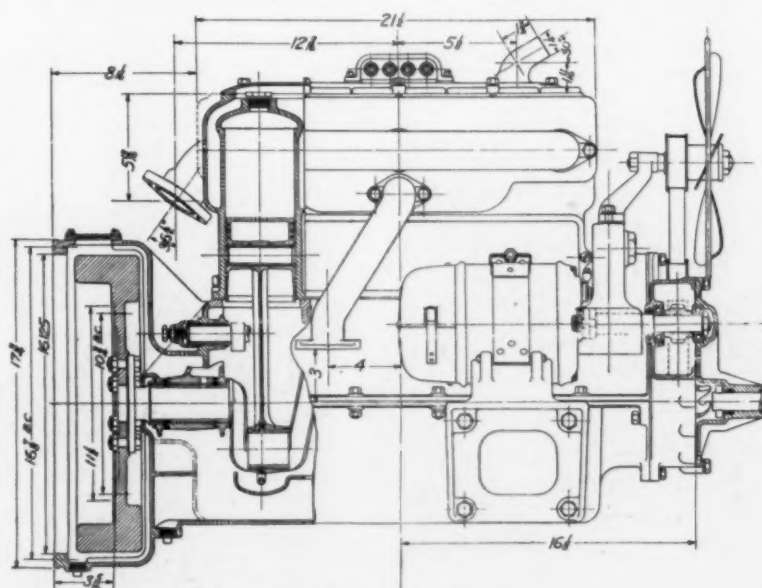
The Ames Equalizing Spring

truck is out of service. Various methods have been devised for absorbing shock and cushioning recoil so as to give the truck spring, the factor of safety necessary for the proper performance of its duty and still not stiffen it to the point of bad riding qualities.

One of the simplest and most effective devices on the market cannot be properly termed a "shock absorber," inasmuch as it consists of a leaf spring of any desired number of leaves, spaced for automatic action by a steel spacing block and applied rigidly by the interchange of slightly longer spring clips to the top leaf of unprotected side of the truck spring.

The Ames is attached so that under normal load it affords two positive points of contact—on either arm of the truck spring midway between clip and shackle. It is claimed that the Ames eliminates destructive vibration, cushions recoil just as the truck spring cushions compression and gives the spring the needed protection on its weak side so as to overcome all spring breakage.

The Ames Equalizing Spring is a patented device and the exclusive license privilege is controlled by Clarence N. Peacock & Company, of New York City.



The Falls Motor, Model F

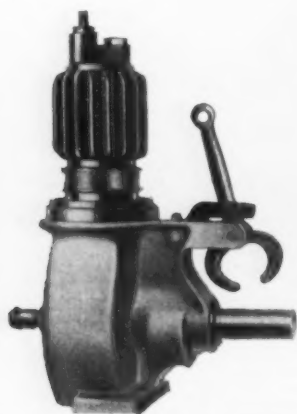
Right side of motor, showing location of generator, and cross section of cylinder

STEWART-WARNER CARBURETOR ADJUSTER, AND AIR PUMPS

The Stewart-Warner Speedometer Corporation, of Chicago, has recently placed on the market a device for automatically adjusting the carburetor mixture. This device is in a class by itself, in that when once adjusted it requires no further adjusting, and automatically takes care of the mixture at all speeds of the motor. No manual labor is required to operate this adjuster, the regulation being taken care of by the temperature of the cooling water of the motor.

The device consists of a metal bulb containing mercury, a connection tube, and a Bardon coil encased in a metal box, from which protrudes a plunger or push rod. The bulb is tapped into the water circulation or attached to it. The adjuster is attached to the carburetor in such a position as will allow the push rod to operate on the air valve (or needle valve). Whatever may be the temperature surrounding the bulb, it influences the mercury in the bulb, and immediately proportions the mixture operating accurately within one degree of indicated temperature, having a range of 5-16 in. of valve movement. When attaching the device the carburetor is first adjusted under normal weather conditions as nearly correct as possible, and the Stewart adjuster is then set in position, but so regulated as to have no effect at this temperature—beginning to act only when the temperature of the water jacket falls below 180 deg. At this point, and all the way down to the 40 deg. mark, it automatically cares for the mixture. On starting the motor the device allows the carburetor to feed a heavy mixture which is gradually thinned down as the motor heats up, in short it automatically proportions the fuel in accordance with the temperature of the combustion chamber. The price of this device complete is \$20.

A recent addition to the extensive line of pumps manufactured by this company is the one-cylinder air pump, illustrated herewith. It is of sturdy and light construction, the base being aluminum. The cylinder is constructed with fins for cooling. The air is protected with a double ball valve, so that if dirt should hold one of the valves open, the other valve would be sure to act, and in this way cause no loss of air.



The Stewart One-Cylinder Air Pump

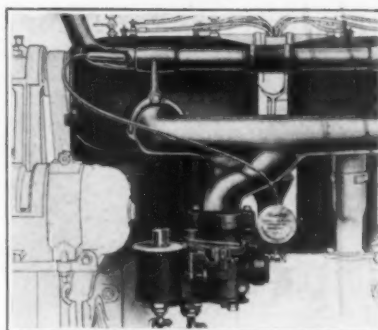
The bore is 17-16 in.; stroke $2\frac{1}{2}$ in. The length of the piston is $1\frac{3}{4}$ in., making an extra long bearing. This is fitted with oil conductors, to insure correct lubrication.

The bottom of the crank case is open, so that in case there should be the least amount of free oil it will immediately drop out. None can be carried up through the air and into the tires.

With the pump is furnished a clutch, a tire gage, and 13 ft. of hose with connections. Price, complete, \$15.



Stewart Thermo-Automatic Carburetor Adjuster

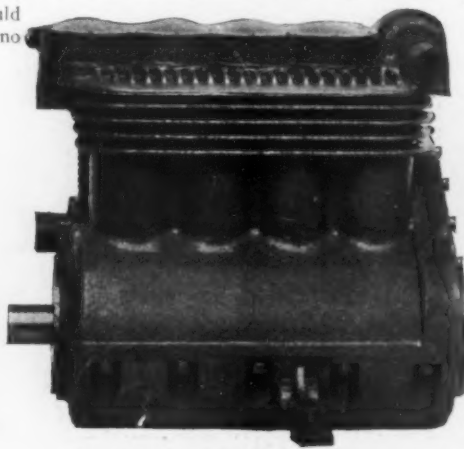


Stewart Carburetor Adjuster Attached to a National Engine

This illustration shows the mercury bulb in its position in the water circulation. This bulb may be tapped into the water circulation, or it may be affixed on the outside.

GEMMER AIR STARTER

The Gemmer-Detroit Starter Company, 712 Ford Building, Detroit, Mich., has just marketed a new air starting system, designed by G. A. Gemmer, formerly of the Gemmer Manufacturing Company.



Gemmer Four-Cylinder Compressor and Motor

The principal unit in the Gemmer air starting system

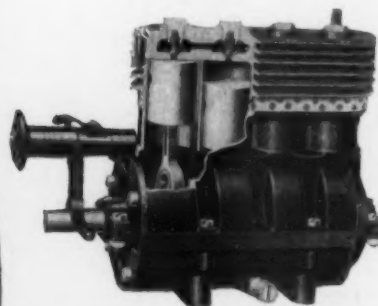
The principle of this design is different from the usual system, where air is distributed to the cylinders, and is more like that of the electric starters, excepting that air is used for the motive power instead of electricity. The main unit is the four-cylinder air-pump or compressor, shown in the cut, with valves such that when the air is returned to it, it reverses and becomes a very powerful air-motor, thus corresponding to the motor-generator of the electric system.

This unit is connected to the crank shaft of the motor by a suitable train of gears, such that it will be driven by the car motor as a compressor at about half crank shaft speed, and when it is reversed and acts as a starter, the speed of the motor-compressor, which may be regulated from 1000 to 1600 r.p.m., as desired, is reduced to about seven to one, thus spinning the crank shaft at a speed of 150 to 225 r.p.m.

The operation of the system is as follows: By means of a foot button a clutch is engaged, and through the proper gearing the car motor drives the unit and compresses air into a tank carried beneath the car. When the desired pressure, about 200 lbs., is shown by the dash gage the clutch is released, and the unit remains at rest until it is desired to use it as a starter. When the starting button is pressed the air returns from the tank to the unit and it spins the crank shaft, disengaging automatically when the motor starts. The unit when used as a compressor, even at low speed, requires but four or five minutes pumping to replenish the tank.

In the system there is but one controlling valve, located on the dash, and but one pipe from the unit to the valve and from the valve to the tank. The unit is approximately 8 x 8 x 4 in., and made after the best practice in high grade motor construction, with cast iron pistons and rings, drop forged crank shaft, etc. It is dust-proof and is oiled automatically from the crank case of the motor.

The total weight of the system is about 55 lbs. It is very economical in the use of air, and will give a great number of starts without replenishing the tank. No part of the system is outside of the car. A hose is supplied which can easily be attached for inflating tires, cleaning the car, etc.



The Stewart Four-Cylinder Air Pump

The Stewart four-cylinder pump has been on the market for some time, the above illustration showing the latest model, which has been changed in that ball valves have been substituted for the 45° valves, and the two piston rings and the one aperture in each piston has been supplemented by a solid piston.

NEW NON-SKID AND TIRE PROTECTOR FOR MOTOR TRUCKS

The Gripper Non-Skid Tire Protector is designed for use on the rear tires of motor trucks to prevent skidding in mud, ice, snow, etc., to provide traction on hills, and last, but by no means least, to protect the rubber and prolong the life of the tire.

That these objects are fully and satisfactorily accomplished has been demonstrated by very thorough tests made during the last fourteen months, the Gripper Non-Skid Tire Protector having been in constant use during that period. In the course of these tests it was clearly demonstrated that the lives of rubber tires were greatly prolonged, the saving to the user in that respect alone during one season being more than equal to the entire cost of a set, the non-skid feature therefore costing nothing. In addition the Gripper allows for extremely heavy loads being placed on trucks without injury to tires.

The Gripper is made of steel of a special analysis, the "V" tread of the grip casting being treated to make it extremely hard and at the same time retain its ductility. The Huffman Manufacturing Company, Youngstown, Ohio, in offering this perfected non-skid tire protector to the public claims that the device will save money for truck tire users and allow the use of trucks twelve months in the year.

NEW BARRETT AUTO JACKS

The Duff Manufacturing Company, of Pittsburgh, Pa., manufacturer of the "Barrett" jacks, has brought out a new series of two-lift truck jacks, equipped with an adjustable foot-lift. The object is to provide two lifts spaced at a distance above each other to correspond with the difference in height above ground of front and rear axles of many cars. The toe or foot is fastened by means of two screws to a horizontal downward extension of the top lift



Barrett Jack with Adjustable Foot Lift

This extension has perforations so that the toe can be set low or high, the lowest position of toe being about 5 in. from the ground, the highest about 9 in. This range will cover all known makes of trucks in which one axle is lower than the other.

The "Barrett" Folding Top is another simple arrangement for meeting the requirements of cars with axles of different

height above ground. The top of the jack consists of two pieces, the lower or stationary top, fitted to the top of the rack and the folding piece which adds 1 or 2 in. to the regular height of the jack.

INTER-LEAF SELF-LUBRICATING SPRINGS

A method of continuous and automatic spring lubrication, that is simple but satisfactory in operation, has been devised and patents applied for by the Detroit Steel Products Company, Detroit, Mich. Small cups or depressions are formed near the ends of the leaves and these are filled with a heavy grease or graphite. The motion of the different members of the spring upon



The Gripper Non-Skid



Longitudinal Sectional View of Inter-Leaf Self-Lubricating Springs



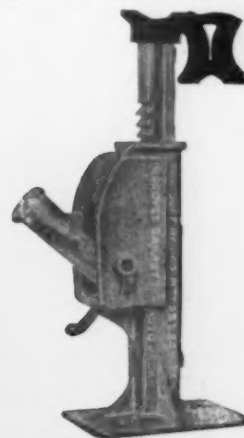
The Cox Brass Company's Welding Outfit

each other serves to spread the lubricant evenly over the surfaces, the points at which the greatest relative movement occurs receiving the largest amount of grease. The cut shows the form of the leaves, each leaf being an individual channel for the lubricant. The manufacturers have found, after exhaustive tests, that one filling every six months is sufficient to secure good lubrication. Filling the grease cups is accomplished by prying the springs apart with a screw driver.

COX BRASS COMPANY'S WELDING OUTFIT

The mere fact that repair work in the form of welding broken parts, etc., is sent out to be done by a third party who makes a profit thereon, is proof positive that there is need for a good, simple and comparatively inexpensive welding outfit. The opportunity of doing all such work in one's own shop and by one's own men is here presented in the form of a simple, complete and practical combination welding and decarbonizing outfit at an exceptionally low price. The merits and success of oxygen acetylene welding are too well known to need lengthy explanation. The method has been in use in other lines of trade for a long time, but the heretofore prohibitive cost of the welding outfits has not made it logical for all uses. The acetylene gas supply is easily secured and the oxygen is also easily obtained without the expense of purchasing cylinders. This, the initial cost of the Cox outfit, is practically the only cost.

This outfit is packed in a special case, as illustrated, which makes it unusually convenient. Complete detailed instructions are furnished with every Cox combination welding and decarbonizing outfit. This company also maintains a service department for the use of all its customers, where any information concerning welding and the operation of the outfit can be obtained.



Barrett Jack with Folding Top

The Cox Brass Manufacturing Company, of Albany, N. Y., has recently issued a very interesting and instructive book on welding of broken parts, etc., also the decarbonizing of motor cylinders. This book, which will be mailed upon request, is a high class piece of work treating thoroughly the application, use and benefits of welding and decarbonizing.



Vim Light Delivery, Completely Equipped, \$635

By D. E. SCRIBER

THE very name is indicative of the character of the product, the Vim Light Delivery, the last to join the forces of the commercial car—the last to join, but the first in its particular and chosen field. In fact, it will come as a surprise to many that there has so far been practically nothing done in the 600 to 800-lb. commercial car field. The manufacturers have not catered to the users needs in these sizes. It is certain there never has been a car built for this purpose and with this capacity to sell at such a phenomenally low figure as \$635. Therefore, the Vim Light Delivery car at \$635 stands in a class by itself.

The makers of this small car are the Touraine Company, of Broad and Huntingdon Streets, Philadelphia, Pa., well-known manufacturers of the six-cylinder pleasure car of the same name. On February 2nd the Touraine Company increased its authorized capital from \$100,000 to \$500,000, expressly for the purpose of facilitating the manufacture in large quantities of this unusually low priced, but as will be shown, remarkably staunch little delivery car. From the inception of the idea in the mind of H. B. Larzelere, president and general manager of the company, every move has been made with the end in view of ultimately producing a car which will hold the same place in the light commercial car field that the Ford does in the pleasure car industry. As with the Ford in its early stages, so it is with the Vim—there is no competition.

Briefly, when one surveys the Vim light delivery the features which stand out most prominently are the fact, that this little \$635 car has a 15-20-h.p., four-cylinder, water-cooled motor, of Northway manufacture, and that all the other units of the construction are of material, size and construction capable of taking care of a 30 or 35-h.p. motor; a 35-h.p. clutch is used, a 30-h.p. transmission, of three-speed sliding gear type, a 30-h.p. rear axle of Weston-Mott construction, and a frame of heavy channel section pressed steel, without insweeps or upsweeps, but rectangular and well braced, which considering its size, makes it an unusually substantial unit. From the radiator cap to the end of the tail gate, the car is a series of surprises to any one familiar with the dimensions of the units usually employed in even larger delivery cars. These features are brought out strongly as they, together with performance and price, are the points by which this product is to be judged. The feeling of the makers in the matter is well put by the president when he said, "For once I am entirely satisfied;

there isn't a thing about the Vim light delivery car that I could or would change. There is nothing that seems questionable, or that I have any doubts about. The job appeals to me as being mechanically right, and I have no hesitancy whatever in putting it into the hands of any and all users."

Built for Abuse

A cursory view of the elements making up the construction, certainly leads one to the belief that the car will stand an excess of abuse, such as it is sure to receive at the hands of the average purchaser.

It is a square-jawed little vehicle, and looks every inch a commercial car. Nobody could by any chance mistake it for a converted pleasure car. It shows in every line that it was built for commercial purposes only. This angularity takes off any look of weakness, inefficiency, or, one might even say, effeminacy, which would certainly accompany a vehicle of this size, if of too graceful and curved an outline.

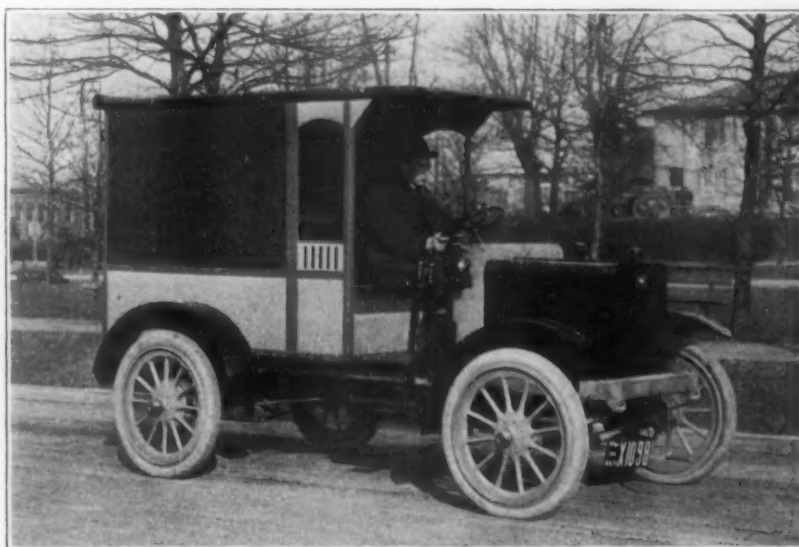
Looking at the chassis plan, it will be seen that the power plant is of the unit type, with large cone clutch fully incased in the forward end of the housing, enclosing the three-speed sliding gear transmission. The drive is through a Spicer universal joint, to a bevel gear rear axle, containing no untried features. The brakes are large, both sides acting on pressed steel

drums, and operating through special eveners, which instead of complicating the construction by their location on the rear axle have actually simplified it.

Is Not a Cyclecar

This car is not in any sense a cyclecar, having standard tread, and a wheelbase of 89 in. As before mentioned the engine is of Northway construction, and was built exclusively for commercial purposes. It is unusually heavy in its sections. For example, although it has but 3-in. bore and 4½ stroke, the crank shaft is 2 in. in diameter, and is mounted in three Parsons white brass bearings. The connecting rods are 11½ in. C to C. The connecting rod big ends when compared to the small pistons look very queer after one is used to seeing large pistons for pleasure car work on less sizeable rods. The pistons are domed, and fitted with three diagonally split eccentric rings at the top. The connecting rod upper ends carry bronze bushings of sleeve type which have their bearing on the hardened and ground piston pins, which in turn are prevented from side slip by bolts passing through the piston bosses and cutting into the side of the piston pins. These bolts are prevented from backing out by cotter pins.

Speaking of cotter pins, etc., calls attention to the fact that throughout the entire



An Epoch-Making Production

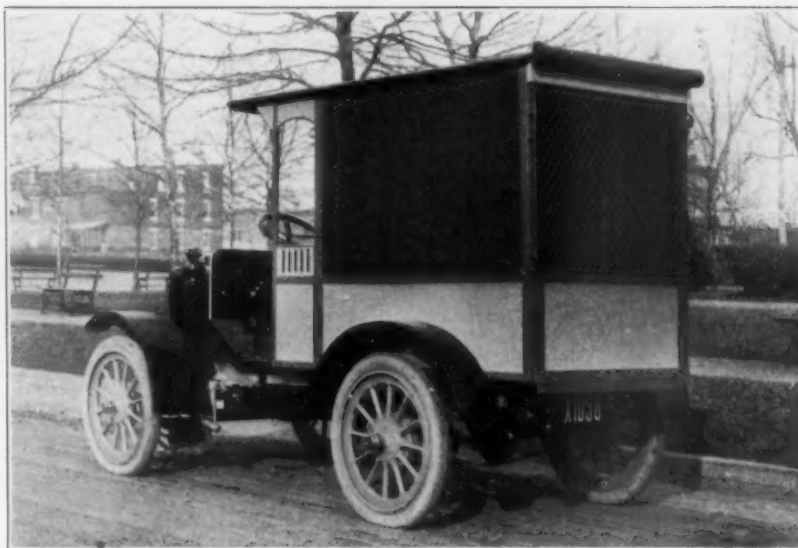
This little car, fitted with a four-cylinder, water-cooled, unit power plant of Northway manufacture, and parts which might be used in a vehicle of one ton capacity, is rated as 600-800 lbs., and is being placed on the market by the Touraine Company, of Philadelphia, at the phenomenally low price of \$635,

construction, every nut, bolt, or adjustment is locked and cottered, so that it is impossible for anything to work loose or fall off. This important matter has been attended to with unusual thoroughness.

The cylinders are cast enbloc together with the entire upper half of the crankcase, making an unusually rigid construction, and saving parts, gaskets, joints, etc. The cylinders are L-type with the valves enclosed. The crankcase lower half in this motor is also of iron, contrary to the usual aluminum practice of pleasure car construction. In fact, the entire engine is built of such ample sections as to be able to withstand the abuses attendant upon commercial car driving. The half time gears are housed at the front in a space connected with the crankcase.

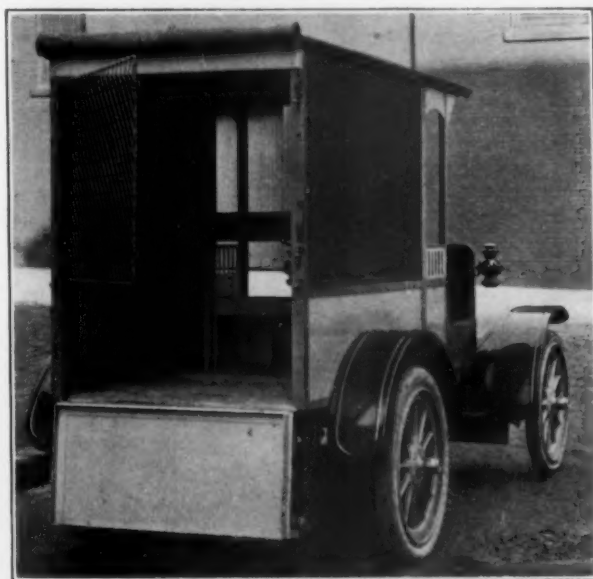
Precision Lubrication

Lubrication is slightly different from that used in the ordinary engine, although the bottom of the case forms a large reservoir having a capacity of 2 gal., sufficient for 600 miles running under ordinary conditions. This is not a sump. The oil which is pumped from it is never used over again, nothing but fresh oil ever reaching the bearing surfaces.



Three-Quarter Rear View Vim \$635 Light Delivery

The appearance of the rear of the car when closed is very businesslike, and also gives a very good idea of the rear axle and springs



Rear of Vim All-Metal Body

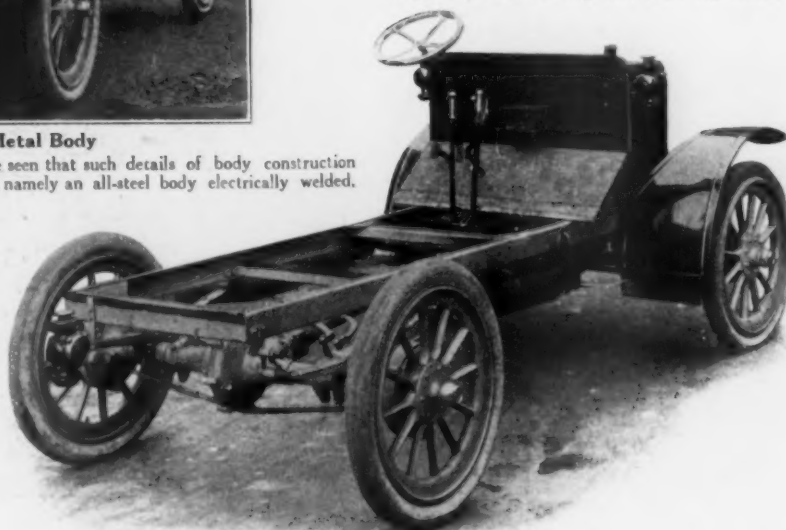
Although this commercial car sells for \$635, it will be seen that such details of body construction as supplied on the very highest priced cars, are included, namely an all-steel body electrically welded, making it a unit, metal tail gate, and hinged screen.

A positive precision measurement pump is shaft driven from the rear end of the cam shaft by a small worm and worm wheel, all parts being enclosed. This draws measured quantities of oil from the reservoir, and forces same through a sight feed at the front of the engine, where it stares the driver in the face whenever the hood is raised. The oil is then fed directly to the half time gears at the front of the case, overflowing into the crankcase to maintain a splashpool which cares for all parts. There is no overflow, and the oil is not used over the second time. This arrangement insures lubricating oil that still retains its lubricating features, which cannot be said of an overflow and return system,

when as often happens, it is abused by not replenishing the oil.

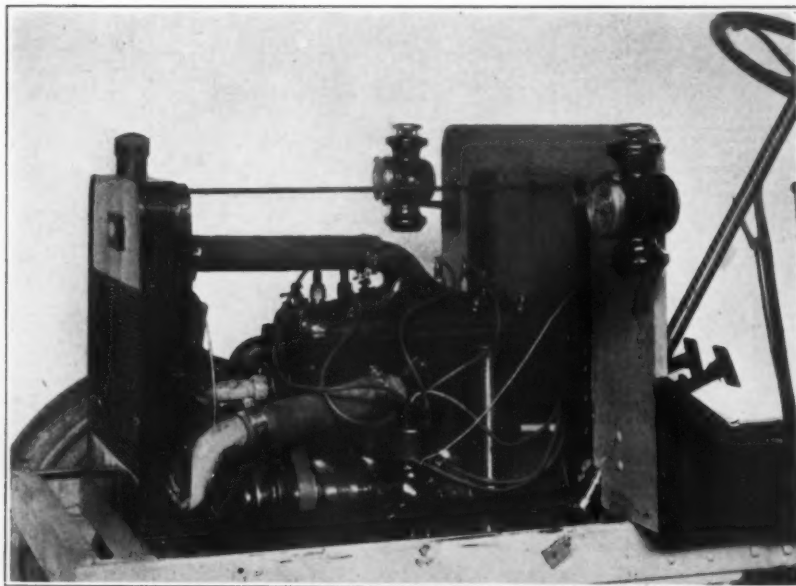
Economical Ignition

Economy of operation has been considered in every detail of the construction of the Vim light delivery. Nowhere is it more pronounced than in connection with the ignition. The Atwater Kent Unispark system is employed, this unit being mounted on a vertical shaft at the left of the engine, and driven from the cam shaft. The distributor is most accessibly located. Approximately 4000 miles is guaranteed from ordinary dry cells with this device. The ignition seems to be perfect, as far as can be judged by riding in the car, the engine never missing an explosion even when idling at a very low number of revolutions per minute, in fact, the writer never has heard a smoother running engine in the highest priced touring car, than the motor



Chassis of Vim

This view shows clearly the staunch frame and rear axle construction, and also gives a view of the dash, the central control levers, and the left-side steering. The wheelbase is 89 inches; tread 56; wheels 30 x 3 1/4; speed 2 to 25 m. p. h.



Unit Power Plant of the \$635 Vim Light Delivery

Compact unit power plant of Northway manufacture, cylinders $3 \times 4\frac{1}{2}$ in., cast en bloc, with thermosyphon cooling. Note the large water pipes. This motor is strictly a commercial car engine; it weighs approximately 450 lbs., all parts being built to stand commercial service.

of this \$635 wagon. With this system the engine is operated practically on a fixed spark, although there is an adjustment on the dash by means of pushing in or pulling out a notch retained plunger; this, however, is used simply to retard the spark when starting or when the motor is running idle. For ordinary driving the spark is set once for all, and the driver does not have to bother his head about it, there being no spark lever of any kind upon the wheel, in fact there are no levers of any kind upon the wheel, as throttling is by accelerator pedal. The driver is thus relieved of these details.

All of the refinements found on the larger cars seem to be incorporated in the design of this delivery vehicle. The carburetor is a Schebler, exhaust jacketed, taking its heating gases direct so that, the instant the engine is started, the first explosions cause the carburetor to become warm, facilitating proper vaporization of the fuel. This exhaust-jacketed carburetor is at the left of the engine in a very accessible position, and receives its fuel by gravity feed from a 7-gal. tank, with convenient filler cap located under the driver's seat.

Thermo-Syphon Cooling

In line with the simplification of the entire construction is the use of thermosyphon cooling, doing away with shafts and pump. At once the large size of the engine to radiator connections is noticeable, these being 2-in. pipes both from and to the engine. The cylinders are cooled not only on the sides, but between them, that is between cylinders 1 and 2, and 3 and 4, there is a cooling space insuring uniform expansion and a minimum of distortional strains, which are so often set up by inefficient cooling methods. The connections at the top of the engine are properly flared to receive the rising water and allow it to flow, following its natural course to the top of a Bush vertical fin tube radiator. The

radiator is enameled in black, harmonizing with the car and body trimmings, and doing away with the necessity for polishing, all of which causes additional work, and is out of place on a commercial car.

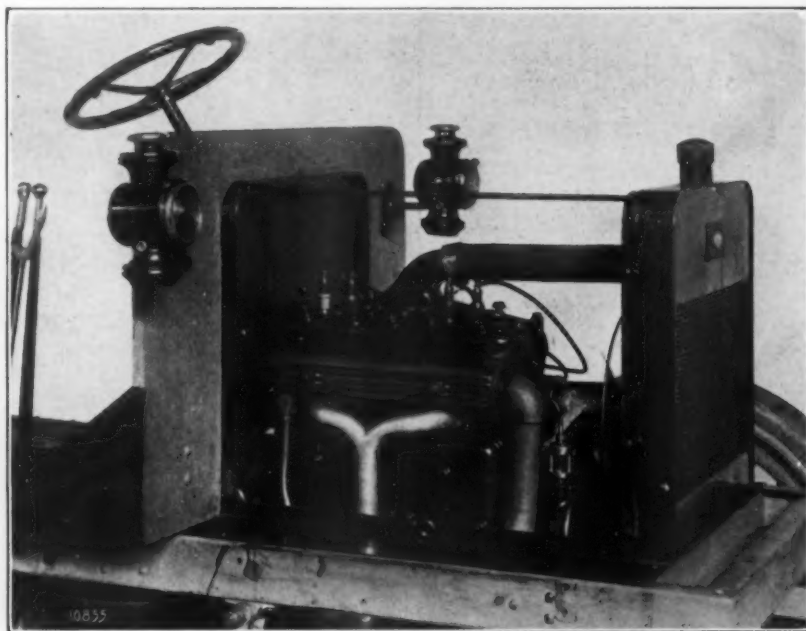
As before stated, the power plant is of unit construction, and is mounted directly on the main frame, of heavy channel pressed steel. The three-speed and one reverse sliding gear set, also of Northway manufacture, is housed in a substantial casing, the forward end of which is expanded

to envelope a 12-in. diameter, $2\frac{3}{4}$ -in. face, 12-degree angle, leather faced, cone clutch, which is guaranteed to transmit from 35 to 40 h.p. This clutch housing is provided with a drain at the bottom, so that any oil which may work into it either from the engine case, to the rear of which it is bolted without gasket, or from the transmission case, may be drained off.

Three-Speed Selective Sliding Gear

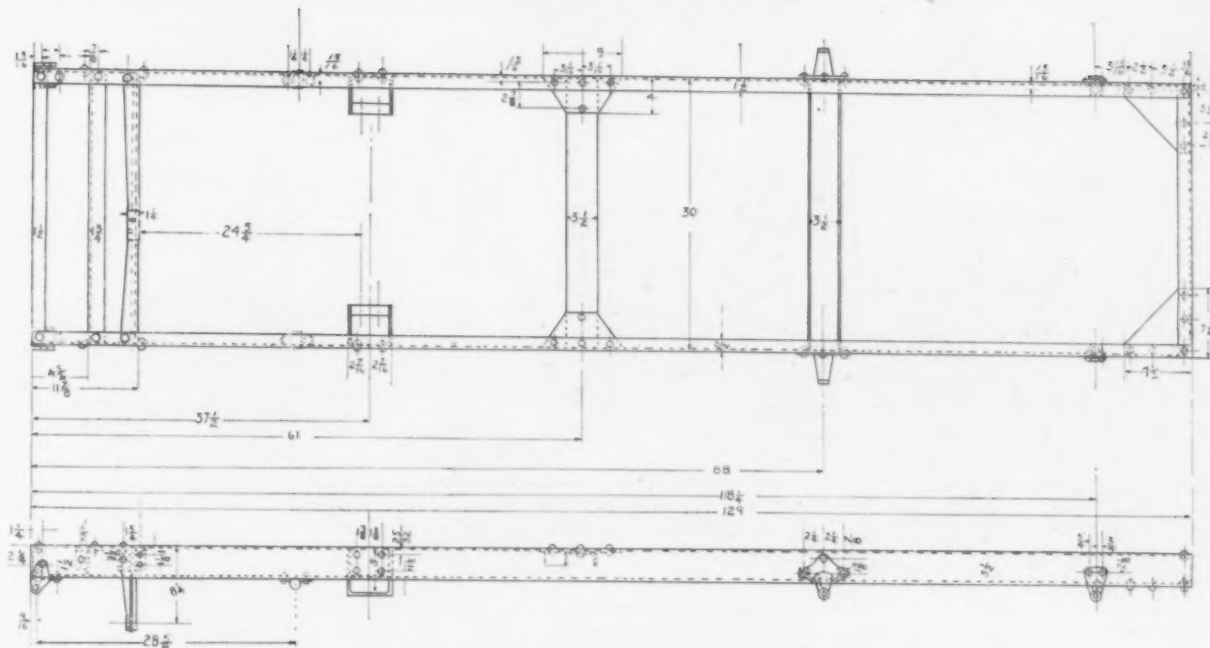
The makers of the Vim believe that a small car should have three forward speeds for efficient service. Following this conclusion, a Northway gear set with the lay shaft below the main shaft has been incorporated. The gears are of suitable alloy steel, and have a full $\frac{3}{4}$ -in. face, all shafts being mounted on F. & S. annular ball bearings. The reverse idler pinion is at one side. This transmission is very short and compact, with large stiff special nickel alloy steel shafts. The gears are 6 and 8 pitch. The operation is selective with a central control lever operating in an "H" grid, the lever being mounted directly on the transmission case with a positive connection, using the shortest possible levers to the gear shift yoke. This case is supplied with the usual body of lubricant, into which the gears dip, and is unusually quiet in operation, the familiar hum on the intermediate gear being entirely absent.

Steering is by the usual hand wheel on the column at the left, a rack and pinion being mounted at the lower end. A feature of this construction is the complete housing of the rack, so that no part of it, even at its extreme positions, protrudes beyond the housing. The drag link and other connections are of standard type using spring pressed ball and socket ends, which take the shock from the steering wheel. In accordance with the more or less massive



Intake and Exhaust Side of Vim Power Plant

Showing the complete encasing of all moving parts, and the clean-cut design of the engine. Attention is called to the ribbed exhaust manifold. The motor is rated at 15-20 h. p., which gives remarkable reserve for a car of this size.

**Working Drawing of the Vim Light Delivery Frame**

The frame is of channel section pressed steel with a side member depth of $3\frac{1}{4}$ inches, well cross braced and gusseted. The channel cross brace at the extreme left forms an efficient bumper. The shortness of the frame makes it unusually stiff

construction throughout, the drag link and steering arms are much larger than would be expected on a vehicle of this size.

Rear Axle Assembly

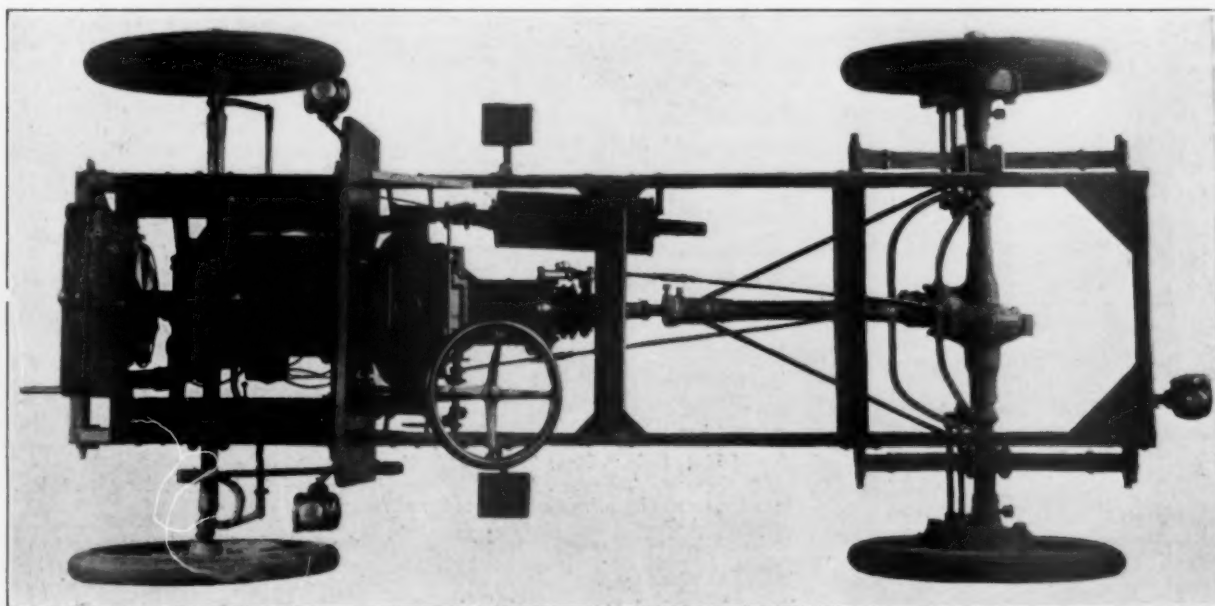
At the rear of the transmission is a substantial universal joint on the forward end of the propeller shaft, which is housed and drives to a full floating rear axle assembly of Weston-Mott construction, this being a 30-h.p. unit. The drive shafts are $1\frac{1}{8}$ in. in diameter, the wheels mounted on Hyatt

flexible roller bearings, and carrying at the center the well-known Brown-Lipe differential of alloy steel construction. This differential is also mounted on Hyatt bearings. The axle is suitably trussed and the propeller shaft housing, which acts as a torque tube, is also trussed.

Front Axle

The front axle, although a tubular type in the car ridden, will be a one piece I-section drop forging, with drop forged en-

closed steering arms all heat treated. The spring seats are integral, with the semi-elliptic springs, which are 30 in. long, four leaves quite flat, and 2 in. wide, of special heat treated steel, mounted on top of the axle. They are attached to the usual spring horns at the front of the frame, and are shackled at the rear. The use of grease and oil cups on the spring shackles, and all parts where any wear whatever comes, is a noticeable feature of the construction.

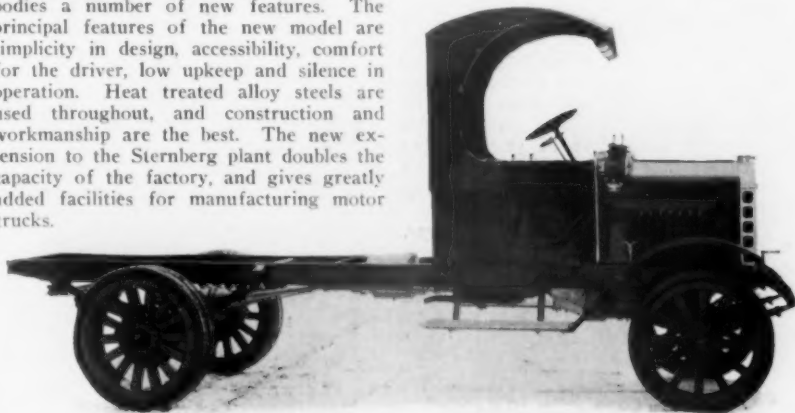
**Plan View of the \$635 Vim Chassis**

Attention is called to what might be termed the brute strength of this construction, which is such as is usually used in cars of much greater capacity; also to the unit power plant, with its three speed and reverse sliding-gear set with central control levers, and to the unusual placing of the single-tree type equalizers at the rear, greatly simplifying the construction.

The Sternberg Two and a Half Ton Worm-Drive Truck



SPECIFICATIONS of the newest truck manufactured by the Sternberg Manufacturing Company, West Allis, Milwaukee, reveal a machine of two and a half ton capacity and fitted with a worm drive. This truck represents the result of much careful study and experiment, and embodies a number of new features. The principal features of the new model are simplicity in design, accessibility, comfort for the driver, low upkeep and silence in operation. Heat treated alloy steels are used throughout, and construction and workmanship are the best. The new extension to the Sternberg plant doubles the capacity of the factory, and gives greatly added facilities for manufacturing motor trucks.



Side View of Sternberg Chassis

Cab over driver is regular equipment. Capacity, two and a half tons

Motor

The $3\frac{3}{4} \times 5\frac{3}{4}$ -in. motor has long bearings and large area, chrome nickel steel crank shaft, small bore and long stroke and self-lubricating governor, easy accessibility to all parts, such disposition of the change as to give great economy of performance. Cylinders and pistons are semi-steel. The crank shaft has three bearings. The crank case is aluminum alloy heavily ribbed. Lubrication is by combined splash and force feed. The governor is fly ball type with the spring, that sets the speeds, also binding the moving parts together. No battery is used with the Eisemann automatic advance magneto. The carburetor is a Holly fitted with a temperature regulator, supplying hot or cold air as required. The adjustment is on the dash. A cast aluminum radiator is used.

The Hele-Shaw multiple disc clutch is bolted to the flywheel and is a unit with the motor, being entirely housed by an accessible aluminum casing. Its "V" shaped steel and bronze plates operating continually in a bath of oil make it extremely flexible, smooth and regular while engaging, and firm in the final grip. Being capable of easy slip, the shocks to the mechanism are eliminated, and wear on the tires and the transmission system is greatly reduced.

The transmission, located back of the seat on a separate subframe, is of the selective type, positive and reliable in operation, having three speeds forward and one reverse, with direct drive on high speed. The speed change gears are always in mesh, thereby obtaining at all times the benefit of the full strength of the working face of the gears, using the gear teeth for transmitting the power only. Each set of sliding jaw

clutches has an aggregate parallel working face of $2\frac{1}{2}$ sq. in. to withstand the shock and strain in making the speed changes. These jaw clutches engage and disengage with perfect ease, no matter how fast the car is traveling, and regardless of the speed at which the gears may be rotating.



Sternberg Transmission

Three speeds forward. Gears always in mesh. Changes effected through sliding jaw clutches

Axles

The rear drive is through a worm and wheel and is a straight line under load. The worm and wheel differential gears and bearings are mounted on the rear axle cover. This unit can be removed by withdrawing the axle shafts and taking out the bolts passing through the cover and the axle housing. The front axle is a one-piece nickel steel drop forging of I-beam section. Timken bearings are located on the steering knuckle head to support the weight of the load and also on the wheel spindles.

Frame and Brakes

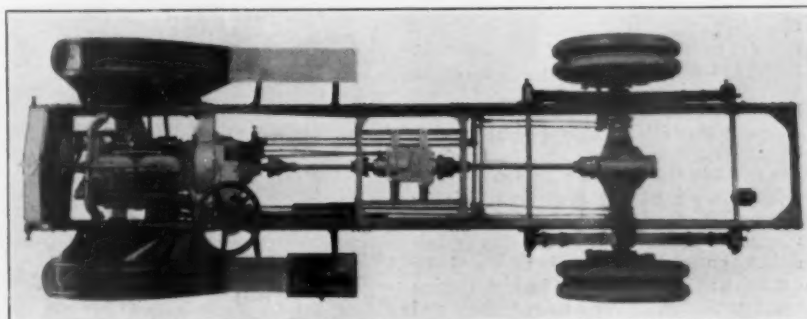
The frame is a heat treated channel 6 in. high. The flanges taper to a wide section where the greatest strength is required. It is of flexible construction bolted throughout having all bolt holes located in the web of the channel.

The service and emergency brakes are located at the rear wheels. Both internal and external are of toggle joint construction and are easily adjusted. The brake drums are 16 in. in diameter, while the bands are 3 in. wide.

Control, Etc.

The steering gear is located on the left side and the control levers in the center. The steering wheel is tapered and keyed to the tube. The lower end of the tube is integral with a steel screw, which, when turned by the wheel, gives a phosphor-bronze sleeve longitudinal motion. This longitudinal motion transmits rotative motion through spirals to the lower steering arm. The transmission and brake connections are direct and have no intermediate supporting arrangement.

The cab is standard equipment and is furnished with a foredoor for the comfort of the driver. A heavy wire screen protects the opening at the rear window. Side, front and rear curtains with mica windows are furnished. No under guard is used, nor is one required, due to the fact that all moving parts are enclosed with the exception of the propeller shafts. The long springs and large wheels make an extremely flexible and easy riding truck. Tires are solid, 34×6 front and 38×4 dual rear. The frame, when loaded, is $33\frac{1}{2}$ in. from the ground.



Plan View of Sternberg Chassis

Four-cylinder $3\frac{3}{4} \times 5\frac{3}{4}$ in. motor; motor and clutch a unit. Transmission carried on subframe with two universal joints on the shaft in front and rear; worm drive on rear axle

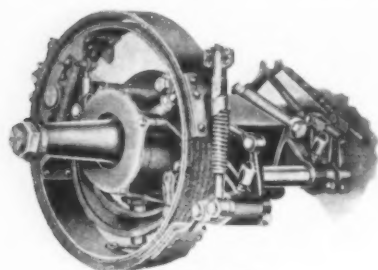
Crown Worm-Drive Trucks—Fifteen Hundred Pounds to Three Tons



THE success which worm-driven commercial cars have had since their introduction has led the Crown Commercial Car Company of Milwaukee, Wis., to bring out a complete line of worm-driven vehicles, running from 1500 lbs. to 3 tons capacity.—Model A, 1500 lb. to 1 ton, Model C, 5000 lb. to 3 tons. The engineering force of the Company is headed by George Van Rottweiler, who can very easily be identified as having been connected with the automobile industry in this country as far back as 1900, when he landed in this country as an automobile engineer for the Mercedes interests. He came over here an engineer, after having been identified with the Daimler Motoren Gesellschaft and Milnes—Daimler, Ltd., in both Germany and England. That "Crown" Worm-Driven Trucks bring with them experience built into them need not be mentioned when the engineering staff of that Company is responsible for these designs.

Motors

The chassis herewith described is the 5000-lb. model. The motor is of the four-cylinder, four-cycle, T-head type, 4 $\frac{3}{4}$ -in. bore and 5 $\frac{1}{2}$ -in. stroke, and is governed at a speed of 1050 r.p.m. The motor is a special one, built to specifications by the Wisconsin Motor and Manufacturing Company whose factory is also in Milwaukee, the



Crown Brakes

These are external and internal, both on rear wheel drums

home of the Crown Commercial Car Company. The diameter of valves is 2 $\frac{1}{4}$ in. with ample water jacketing space. The main connecting rod bearings are lubricated under pressure by a gear pump driven from a cam shaft. The cam shaft and wrist pin bearings, also pistons, are lubricated by splash system, whereas connecting rod and main bearings receive their oil supply through the hollow crank shaft, where oil is always under pressure.

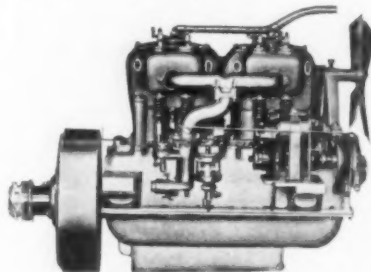
Ignition on all "Crown" models is by Bosch ZR 4, waterproof, high tension magneto. It is controlled by a single switch on the dash and advanced by control on steering gear. The high tension wires run through hard rubber plugs and are then strung through the air, receiving therefore proper insulation. The carburetor is specially built for slow speed work. Control is effected by a foot accelerator

and throttle on top of steering wheel, and water is forced through the motor from a vertical tube radiator, which is so built as to provide quick flow and maximum cooling efficiency at the speed the water is forced through the entire engine system.

Clutch and Transmission

The clutch is of the standard cone type, faced with leather. The surface is very large in diameter and with engagement and disengagement is by foot control through fork mounted in ball bearings on the clutch. A double universal joint between clutch and transmission takes care of proper alignment. This universal is block type with very large bearing surface. It is completely cased in and filled with grease.

The transmission is of the selective type, four speeds forward, one reverse, direct drive on third speed. By means of a safety catch, it is impossible to have more than



Right Side of Crown Motor

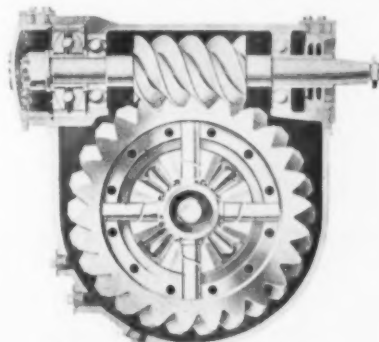
The motors are four-cylinder cast in pairs and of ample dimensions. This view shows the mounting of the Bosch magneto and special low-speed type carburetor.

one gear in mesh at one time. All transmission gears are of very wide face and are carefully heat treated, alloy steel throughout. Imported ball bearings of the annular type are used and the ends of the shafts of transmissions are provided with packing boxes to prevent any leakage of oil if possible.

The Drive

Power is transmitted to the rear axle by a large diameter, tubular propeller shaft, having universal joints at each end. The worm-driven rear axle is three-quarter floating construction. The shafts and differential housing are mounted on double

row imported bearings. The worm ends are carried on two large annular bearings, while the thrust is taken off by a double thrust bearing which prevents the thrust from coming on the bearings which carry the radial load. The worm and gear are mounted in a carrier, which in turn is bolted into the one-piece axle housing.



Crown Worm Drive With Case Cut Away

The axle housing is fitted with drain plugs which indicate the proper oil level. The front axle is of heavy I-beam section. The front wheel bearings are of the double row imported type.

Wheels, Brakes and Springs

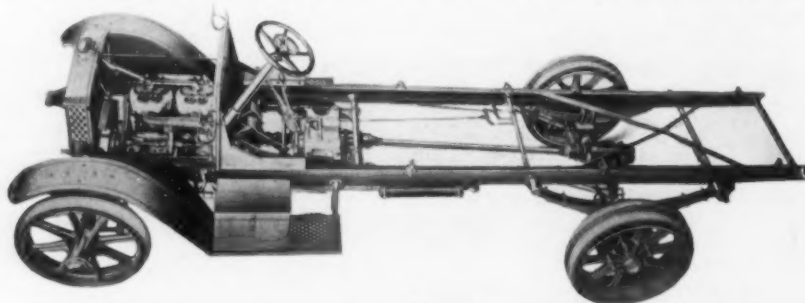
The front and rear wheels are of vanadium steel with cross section spokes. These wheels are advised as equipment, but wood artillery wheels are mounted. The front wheels are 34 x 4 in. with single tire. The rear wheels are 38 x 4 in. with dual tires.

The service brakes are of the external contracting type operated by a foot pedal, while the emergency brakes are of the internal expanding type operated by the hand lever. Both brakes are located on drums on the rear wheels, and can be taken up by hand without the use of any tools.

The front springs are semi-elliptic, 38 in. long by 2 $\frac{1}{2}$ in. wide. The rear springs are also semi-elliptic, 60 in. long by 3 in. wide, which makes a very easy riding spring at all loads.

Control, Equipment, Etc.

The steering gear is mounted on the left side with the control levers at the center.



Crown Chassis

Note worm drive and steel wheels, the latter being recommended as standard equipment

The steering gear is of the irreversible screw and nut type. The extra large bearing surface found in this part are ample to take care of road shocks and reduce the wear to a minimum.

The main frame members are made very strong. The sub-frame is hung at the front on a pivot joint and at the rear at two points widely apart. This gives a perfect three-point suspension, taking all strains

that come on the main frame away from the power plant.

Equipment includes chassis, driver's seat, gasoline tank of 25-gal. capacity, one pair side lamps, one tail lamp, horn and tool kit also metal lugs for fastening body to frame. The wheelbase of the 5000-lb. truck is 150 in. and the price for chassis and seat back in lead is \$3000.

The 3000-lb. truck is constructed on the

same general lines as the 5000-lb. truck, the price is \$2300. The front tires are 34 x 3½ in. single and the rear tires are 38 x 5-in. single, while the wheelbase is 140 in.

The Model A Truck which is 1500-lb capacity is built exactly on the same lines as the larger models except that it has a unit power plant, three-point suspension, pneumatic tires and 130-in. wheelbase. The equipment is the same as all other models.

The Standard Model-A One-Ton Truck



SALESROOM has been opened at 2348 Euclid Avenue, Cleveland, by the Standard Motor Truck Company, of Warren, Ohio. H. B. Young is in charge. This Cleveland office will have charge of the distributing of the Standard truck through practically all of Ohio. J. A. Boyd is the mechanical engineer of the company; C. W. Moody is sales manager and M. J. O'Conner, secretary.

The company is turning out a one-ton truck known as Model A. This truck weighs 2700 lbs. complete.

Motor

The power plant consists of a four-cylinder, water-cooled Hazard motor, placed under the hood. It is rated at 30 h.p. and has a bore of 4 in. and stroke of 4½ in. The water circulation is maintained by a pump. The crank shaft is of three-bearing construction and all valves are enclosed. The oiler is self-contained, combining a splash and gear pump. Crank case is full aluminum and the entire motor unit is three point suspended. Bosch dual magneto furnishes the ignition. Carburetor is Stromberg or Schebler. Radiator is a genuine honeycomb.

Clutch and Transmission

Multiple disc running in oil is a unit with motor. Automatic lubricating device contained in dust-proof case. It is specially arranged for accessibility. The transmission is Covert manufacture and selective sliding gear type and affords three speeds forward and reverse. Gears and shafts are chrome nickel steel, heat treated.

1¼-in. face gears are employed. Hyatt high duty type roller bearings are used throughout the transmission and differential.

Drive

Jack shaft is a Russell pinion gear type with extra large heat treated gears. The

and fellow are extra large. Tires are solid demountable 3 in. front and 3½ in. rear. Two sets of brakes are fitted. Both are of generous dimensions; the jack shaft set is external and the rear hub set internal. Springs are semi-elliptic. Front is 40½ x 2 in., with one end free riding on hardened steel roller under frame; rear is 52 x



Standard One-Ton Truck

Fitted with covered flare-board express body. The power plant consists of a Hazard four-cylinder water-cooled motor, located under the hood. A speed governor limits the motor speed to 1200 r.p.m. Motor is three-point suspended.

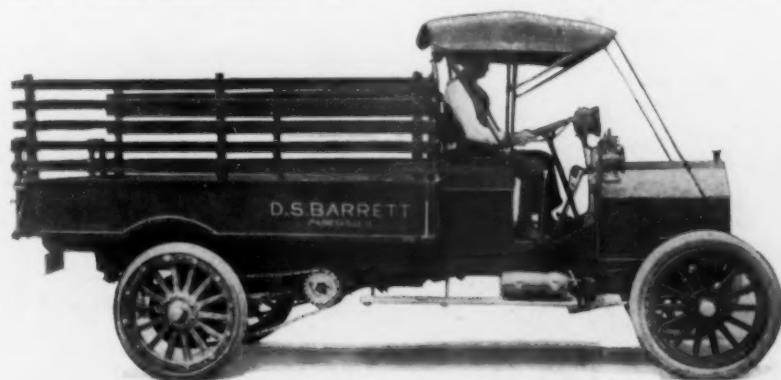
side chains are ¾ x 1½ in., riding on heat treated sprockets. Axles are Liggett, heavy I-beam type, vanadium steel, with integral spring seats. Rear is 17½ x 3 in., and front 15½ x 2½ in. Spindles are extra large and fitted with Standard roller bearings.

Wheels, Brakes and Springs

Wheels are 36 in. front and rear with 1½ in. second growth hickory. The flange

2½ in. and free at both ends, also riding on hardened steel rollers.

Frame is pressed steel, 3-16 in. stock and 4 9-16 in. high. Gasoline tank, 17-gal. capacity, is located under the seat. Steering gear is worm and gear type, equipped with ball bearings. Throttle is on steering column; set spark is used. Tread is 58 in. Wheelbase is 124 and 134 in.; load space on both is 8 ft. Equipment includes seat, gasoline tank, front fenders, three oil lamps, complete set of tools and tools box, horn and jack. Price is \$1700 f.o.b. Cleveland, Ohio.



Standard One-Ton Truck

With slat-extension, flare-board body. Made by the Standard Motor Truck Company, of Warren, Ohio. The price of this car, completely equipped, is \$1700. Made in two wheelbases, 124 and 134 in.; tread 58 in.

STEGEMAN MOTOR TRUCK COMPANY AGENCY FOR STEGEMAN MOTOR CAR COMPANY

In the January issue there was a note which was somewhat misleading in regard to the Stegeman Motor Truck Company, of Milwaukee. This Company has not been reorganized, simply the factory branch in Minneapolis has been turned into an agency under the name of the Stegeman Motor Truck Company, of Minneapolis, a corporation authorized under the laws of that State, and entirely separate and distinct from the Stegeman Motor Car Company, of Milwaukee.

Adams Trucks—One, One and a Half, and Two Ton Capacities



FOR 1914 the Adams Brothers Company, of Findlay, Ohio, is offering a line of three models—A, one-ton capacity; D, one and a half ton capacity; and E, two-ton capacity. These cars are of practically the same construction, but the heavier components necessary for the loads to be carried are used in the heavier models. For this reason we deem it sufficient to give a general description, pointing out the specific differences in the three machines.

The Motor

The entire line is fitted with the well-known Continental motors. They are four-cylinder, four-cycle, water-cooled of L-head type and en bloc construction, with enclosed valves. The small motor is $3\frac{3}{4} \times 5\frac{1}{4}$ in., while a $4\frac{1}{8} \times 5\frac{1}{4}$ -in. motor is used on the two larger machines. The carburetors are $1\frac{1}{4}$ -in. float feed type, controlled by foot accelerator only. Ignition is by Eisemann automatic advance magneto. Oiling is by plunger pump system with constant level troughs and sight feed on dash.

The dash type radiator is vertical tube type and mounted on flexible couplings. Circulation is by centrifugal pump. Fan is located in the flywheel. Bronze-backed nickel babbit bearings.

Clutch, Transmission and Drive

The clutch is multiple dry disc type. The transmission Warner manufacture and selective type, giving three speeds forward and one reverse. It is three-point suspended and, with the differential, is equipped with F. & S. bearings.

Drive from clutch to transmission is by shaft. The jack shaft is full-floating type. Drive from jack shaft to rear wheels is by means of $1\frac{1}{4} \times \frac{3}{4} \times \frac{3}{4}$ -in. Whitney roller chains. One Spicer universal joint is used on each end of the propeller shaft. The

axles are Timken manufacture, fitted with Timken bearings, I-beam front and rectangular rear.

The one-ton sprockets are 17 tooth front and 44 rear; the one and a half ton, 15 front and 44 rear; and the two-ton, 17 front and 54 rear. For special work requiring greater speed, larger sprockets can be fur-

Wheels are 36-in. artillery type hickory, S. A. E. standard. They are fitted with solid demountable tires and S. A. E. bands. The one-ton has $36 \times 3\frac{1}{2}$ and 36×4 -in. tires; the one and a half ton, $36 \times 3\frac{1}{2}$ and $36 \times 3\frac{1}{2}$ -in. dual; and the two-ton, 36×4 and 36×4 -in. dual. The brakes are 10×3 -in. service, mounted on the jackshaft, and



Adams Model A One-Ton Truck

Wheelbase 121 or 136 in., at purchaser's option. Continental four-cylinder, L-head, en-bloc motors are used on the three models

nished. The radius rods are special design to give universal motion between the jack shaft and rear wheels.

Frame, Springs and Wheels

The frame is conventional pressed steel, side rail depth 5 in., and section of $\frac{3}{16}$ in. in the two small machines and $\frac{7}{32}$ in. in the large machine. The springs are semi-elliptic all around, $2\frac{1}{2} \times 44$ -in. front on all models, and $2\frac{1}{2} \times 44$ rear on the two small models and 3×50 in. on the large.

$13\frac{1}{2} \times 2\frac{1}{2}$ -in. emergency on the rear wheels.

Control, Equipment, Etc.

The Ross steering gear with large hand wheel is located on the left with control levers in the center. The gasoline tank is eighteen-gal. capacity. The wheelbases are 121 or 136 optional on one-ton and one and a half ton models and 140 in. on the two-ton. The gage 56 in. on the small machine and 60 on the large ones.

Equipment includes dash and tail oil lamps, horn, oil can, tool kit, jack and set of wrenches. Price of chassis includes driver's seat, having a capacity for two persons, on which all the upholstery is of high grade leather. Single cushion used. Single or dual lazy-back at option of purchaser.

Speed is controlled by governor at 15, 14 and 11 m.p.h. Maximum loading space back of seat is 108 and 132 in. on the two small models, and 138 in. on the large model.

Model A, with either wheelbase, in priming coat with driver's seat and standard equipment, sells at \$1850. A charge of \$20 is made for painting chassis and driver's seat. Color at purchaser's option. Model D, in either wheelbase with driver's seat, standard equipment and painting, sells at \$2300; model E, under same conditions, at \$2500. Lettering is extra in all cases.

The use of electric trucks in hauling Chicago's garbage and waste would save the city \$15,775 per year, while in hauling crushed stone and asphalt 25 per cent of the present cost would be saved.



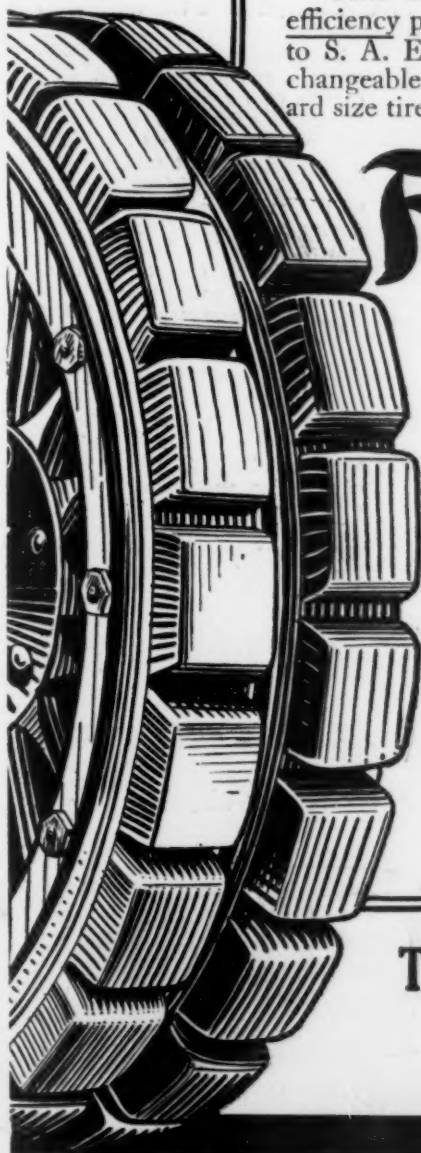
Adams Model E Two-Ton Truck

Wheelbase 140 in., tread 60 in.

Abolish Truck Delays

FIRESTONE Truck Tire quality and construction, together with Firestone Quick-Removable Rim equipment, mean the equivalent of repair shop service in every locality where trucks are used. Firestone Branches, Agencies and Repair Shop service stations have been established throughout the country. In communities where these have not been installed, truck owners are completely protected against difficulties by a quick-removable equipment that insures fewer and shorter delays.

This equipment cuts cost of upkeep and makes real truck efficiency possible. Firestone Removable Equipment is all built to S. A. E. standard. All Firestone Tires and Rims are interchangeable on the same felloe bands with all other S. A. E. standard size tires of any type or make.



Firestone Truck Tires

Firestone Notched Tread truck tires for heavy duty give most mileage because of continuous base—prevent damaging “traction wave”—minimize vibration—remove excessive strain on any point. They are cured in Firestone Quick-Removable Rims.

Firestone Channel Type Hard Base truck tires, on Firestone Quick Removable Rims, insure steady support against tearing loose. Rigid channel prevents expansion. Upturned sides or flanges of the rigid channel insure perfect base support and also protect rubber from side abrasion. Rubber has every chance to wear down to lowest possible point.

Other types of Firestone truck tires represent the same high ideals and proved principles of construction.

“Firestone” should be your solution for all truck tire problems. Change to Firestone is quickly made, to your decided profit and convenience.

The Firestone Tire & Rubber Company

“America's Largest Exclusive Tire and Rim Makers”

Akron, Ohio

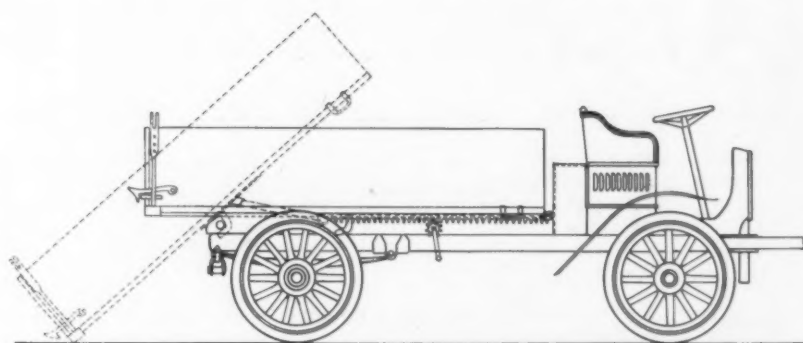
All Large Cities

Pneumatic Tires, Truck Tires, Pleasure Electric Tires, Carriage Tires,
Fire Apparatus Tires, Rims, Tire Accessories, etc.

Autocar Brings Out Dumping Body

The Autocar Company, of Ardmore, Pa., builder of the well-known Autocar delivery car, has perfected a two-ton hand-operated dumping body to be used on its regular chassis. This machine has been the sole product of this company for some time past and has consequently been very well watched in its work and perfected in every detail as soon as the necessity for any improvement became apparent. The machine has consequently given such satisfaction that many contractors, road builders, etc., have sought this machine fitted especially to their work.

The result is this body, which is 102 in. long, 57 in. wide at the top and 46 in. wide at the bottom. It has a depth of 20 in. The body rests on double hickory sills which are spaced so as to take a 2-in. steel roller. These sills are metal covered. On the bottom of the body there is a metal runner, which travels on the rollers.



Elevation of Two-Ton Autocar Dumping Body

The broken lines indicate the lowered position. The rack, placed in the center of the frame, engages a gear which is rotated by a crank, as shown in our other illustration. The rear end of the rack has a connection arm, fastened to the body. By this means the body is carried back and forth as desired.



Autocar Two-Ton Dumping Body

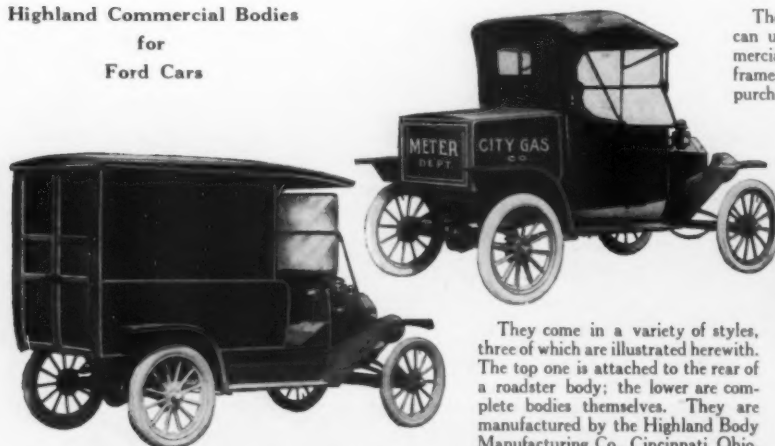
Body is 102 in. long, 57 in. wide at top and 46 in. at bottom, and has a depth of 20 in. and a capacity of 60 cu. ft.

The entire mechanism is very simple, yet complete, and practical in every sense. It consists of a rack which is placed in the center of the frame. This rack travels over a gear attached to a steel rod, and to this is attached a ratchet used for moving the body backwards and forwards. At the end of this rack is a connection arm, which fastens to the frame on the body at the center. There is a heavy steel cross bar with projecting ends at the rear of the frame. There are also two heavy forged stopping cleats on each side of the body.

The body is turned back by means of ratchet on the side until it strikes the cleats, when it automatically dumps. There are grab handles on the side near the front to enable the operator to pull the body back to the frame, when the ratchet is again used to work it forward. It is easy and simple of operation, and is operated by one man without a great deal of effort.

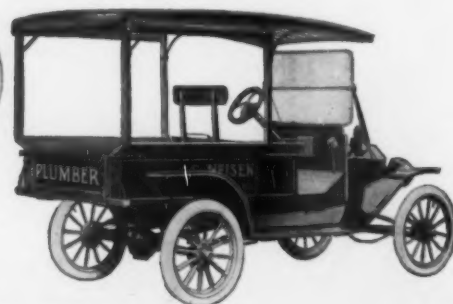
The tail gate is hinged at the top and fastened at the bottom with two drop hooks. This body has a capacity of 60 cu. ft., and is suitable for hauling cinders, soft coal, mud, earth, concrete, trap rock, asphalt and any general building material. Price, complete, \$2200.

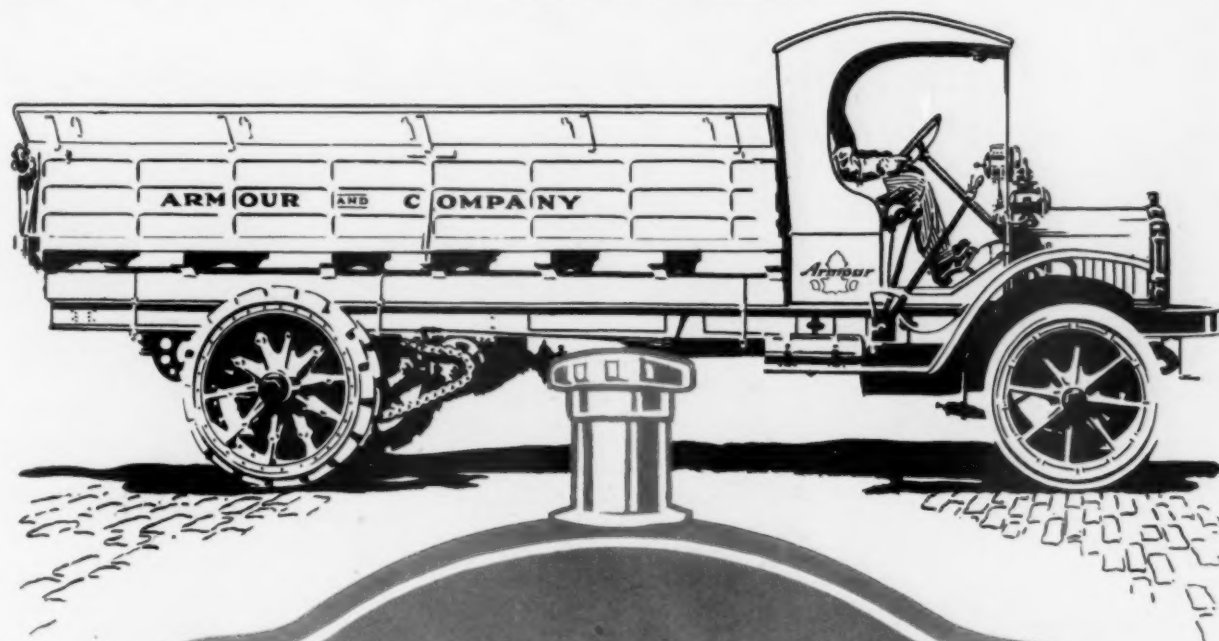
Highland Commercial Bodies for Ford Cars



They come in a variety of styles, three of which are illustrated herewith. The top one is attached to the rear of a roadster body; the lower are complete bodies themselves. They are manufactured by the Highland Body Manufacturing Co., Cincinnati, Ohio.

These bodies are to provide a means by which the Ford owner can use his car for pleasure on holidays, etc., and for light commercial work during the week. They are constructed with wooden frames, covered with metal and can be painted according to the purchaser's requirements by his own painter.





Business Pride and White Trucks

The man who can look from his office windows and see White Trucks bearing away his goods, realizes that he and his business are being fitly represented. This is a matter of supreme importance to the man who realizes the value of prestige in the commercial world.

The Public recognizes the White Radiator—knows it for a badge of superiority—respects the house that uses White Trucks.

The fact that there are more large fleets of White Trucks than of any other make is significant of their greater efficiency and economy.

A style, capacity and power need for every requirement.


THE WHITE COMPANY

CLEVELAND

Both in quantity and value of production, the largest manufacturers of commercial motor vehicles in America.

The Pull-More Front Drive Truck



PULL-MORE MOTOR TRUCK COMPANY, 1019 Dime Bank Building, Detroit, Mich., is the producer of a new and unique front drive truck, called the Pull-More. This truck is the result of nine years' experience and contains several distinctive and original features, among which might be mentioned: two-unit plan, which greatly reduces vibration; front wheel drive, which gives greater mileage on gasoline; power plant, transmission and differential forming a single unit, insuring proper alignment of parts at all times, and a hinged crank case, giving easy access to parts for inspection, etc.

Two Units

The load carrying unit is separate from the power unit, having a connection through a bridged iron reach, which operates on a hinged device, located midway under power unit. The duty of this hinge is to allow for all obstructions and unevenness of road.

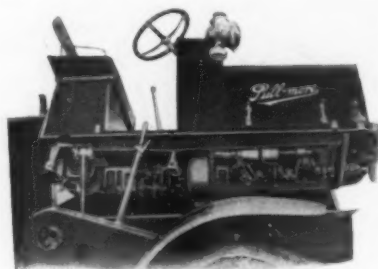
The Load Unit

The load unit is furnished in two sizes—one and two-ton—each capable of a one-half ton overload. Finished in priming coat, the one-ton size lists at \$1800 and the two-ton at \$2000. The unit is carried on semi-elliptic springs and solid rubber-tired wheels. The construction allows the loading platform to be only 28 in. from the ground, making loading and unloading very easy and quick. The stake body is shown in our cut, but any style of body can be attached easily. The rear axle is, of course, dead.

The Power Unit

Under the hood is carried the four-cylinder, L head, en bloc motor. Bore is $3\frac{3}{4}$ in. and stroke $5\frac{1}{2}$ in. Valves have stems and springs enclosed by a dustproof cover. Bearings are die cast white metal, and lubrication is by positive force feed, operated by pump, combined with splash system. The carburetor is a Stromberg and the magneto Bosch.

The clutch is a special fibre-faced cone with auxiliary ring. It eliminates sudden thrusts and provides gradual attainment of momentum. An easy engagement for the different speeds is regulated by a new and clever design of a throw-out collar made integral with the clutch, which also acts as a brake when a change in gears is desired.



Pull-More Accessibility

The motor clutch, transmission and differential are carried on upper section. Raising this leaves the parts open for inspection, etc.

Transmission is sliding gear selective type, three speeds forward and reverse. Gears are heat-treated chrome nickel steel. The differential and jack shafts are Timken manufacture, specially heat treated. They are mounted on the same unit as power plant. The transmission and differential are carried on Hyatt rollers.

Final drive is by double side chains from jack shaft sprockets to front wheel sprockets. The front axle is straight, thus doing away with knuckles, etc. With the power plant pulling straight away in any direction, the maximum efficiency of traction is attained, and the consumption of gasoline is reduced to a minimum, as well as the wear and tear on tires. By means of the drive being on the front wheels, the Pull-More is rendered non-skidable in that it pulls the load.

Accessibility and Steering

The power plant is mounted over the front wheels and is encased in a dustproof.

two-piece casting. The motor is mounted on upper section of casting; bearings of crank shaft, cam shaft, transmission, and differential are all carried in upper section. The lower casting contains all steering device and lubricating system. To get at the parts, by means of a clever and practical device, the propeller shafts are disengaged, thus permitting the raising of upper casting by hinged movement, which leaves all working parts exposed to view. This feature is a great step toward simplicity.

The steering device is operated by power furnished from the motor. This is accomplished by a sprocket on the main crank shaft of motor, which drives a countershaft located in the lower crank case, by means of a chain. This countershaft operates arm of steering reach, which is a part of the king bolt, the latter being located midway between front wheels. This king bolt forms the axis upon which entire front unit revolves. Differentials are provided in steering reach to permit right and left steering.

With this design of steering, it is possible to obtain an unusually short turning radius, so desirable in placing truck for either loading or unloading, and permits of tacking on bad roads. Another feature of advantage in this method of steering is the turning of headlights, with front unit so that they conform to any angle of the road, insuring a light directly in front of the truck at all times.

Solid 34×4 tires are fitted on 34 in. artillery wheels. The front springs are full elliptic. Brakes operate on front wheels and jack shaft. The one-ton machine weighs 4000 lbs. approximately and has a 15-gal. gasoline tank in the cowl. Three oil lamps, horn and tool kit comprise the equipment. Stake body is furnished at \$125, and express body, without top, at \$150.

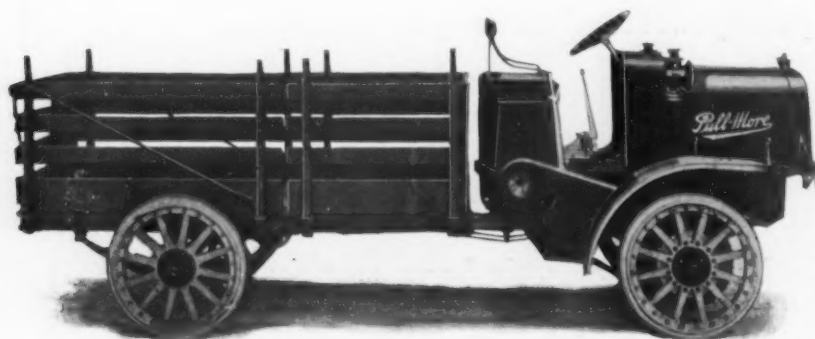
THE SAMSON "EIGHT-HORSE PULL" TRACTOR

This tractor, through its low height of 50 in. from the ground, is especially adaptable to orchard, vineyard and general farm work. It is the product of the Samson Iron Works, Stockton, Cal.

Power Plant

This is a four-cylinder, four-cycle tractor type, with enclosed base. Its maximum speed is 575 r.p.m., developing 25-30 h.p. The bore is 5 in. and the stroke 7 in. The crank shaft is $2\frac{1}{2}$ in. diameter, 1 in. offset and five-bearing type. Hollow piston pins and crank pins are provided with three methods of oiling, insuring positive lubrication. Regular oiling is by a mechanical force feed oiler, with leads to the parts to be lubricated.

Mechanically operated enclosed intake and exhaust valves are used. Valve chambers are water-jacketed and provided with caps for easy access to valves. Easily removable cleaning plugs are fitted in the

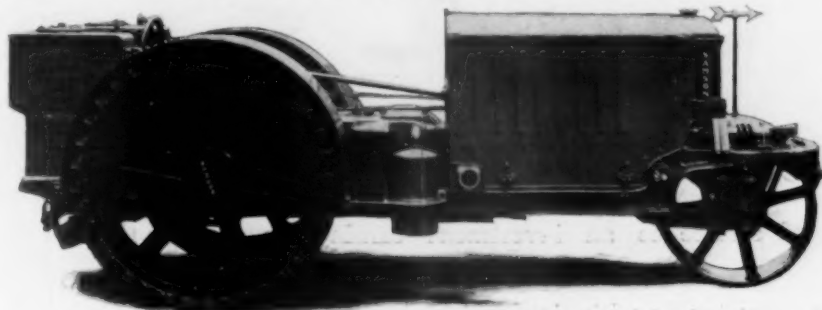


Side View of Pull-More Truck

Showing the two-unit feature. The load-carrying unit is coupled to the power unit by a bridged iron reach, which operates on a hinged device, located midway under power unit

center of the cylinder heads. Ignition is by high-tension magneto mounted on engine. The carburetor is a Holly with no moving parts, using engine distillate, or kerosene when ordered. The two cast iron fuel

clutch is a marine double expansion, running in oil. Two levers are provided, one for gear shift and the other for ahead and reverse. Drive is through floating axle to crucible steel traction wheels.



The Samson Tractor

tanks have a capacity of 20 gal. A rotary pump and tubular radiator with fan are parts of the cooling system.

The transmission has vanadium steel gears, running in oil. It gives two speeds ahead, two reverse at 2 and 4 r.p.m. The

An independent foot brake is provided on each traction wheel. Frame is I-beam crucible steel. Traction wheels are 48 in. diameter, the front wheel 32 in. diameter and 12 in. wide. The tractor weighs 7000 lbs., and is 12 ft. 5 in. long.

How Long Will Your Truck Stand Up?



THE branch manager of a well-known truck concern met with the manager of a wholesale grocery house, who at once proceeded to air his superior mentality by propounding a series of questions so ridiculous it was with difficulty the branch manager kept a straight face.

"How long will one of your trucks last?" he inquired, "not approximately, but how long?"

"Nobody can answer such a question," said the sales manager when he had recovered his mental equilibrium. "So many different factors are to be taken into consideration that it would be foolish to make a prediction."

"That's the way with all you fellows," said the manager, pompously. "You come in here and hand out a line of talk, and when a man tries to pin you down to simple facts you sidestep. Now, don't you?"

The manager smiles at the thought of the manner in which he had discomfited his visitor, and turned to his desk, as though to close the discussion. It happened, however, that the truck man was not to be put off by any such subterfuge. He knew his business.

"I'm going to answer you in your own words," he said, leaning forward in his chair, and stretching one arm across the table which separated him from the man at the desk.

"That's a good looking suit of clothes you are wearing," he continued, after a moment's pause, to let his opening declaration take effect.

"What's that got to do with motor trucks?" queried the puzzled manager, turning halfway around, and eyeing his caller curiously.

"Just this. When you ordered that suit from your tailor you selected it because it was pleasing to you, didn't you?"

"Well—yes—chiefly so."

"Did you ask him exactly how long it would wear?"

"Of course not. Who ever heard of such a thing?"

"That's the point, exactly. Who ever heard of such a thing? You took his word for it being good material. Supposing, though, that you had asked him, and he had seen fit to answer truthfully. He would have told you that the wearing qualities of the seat depended largely upon how much you sat at your desk and shifted around on your chair. He would have told you that the bottoms of the trousers would become frayed according to the frequency with which they rubbed across your shoes, or the legs came together as a result of some peculiarity in your walk. He would have told you that the length of time intervening before the trousers bagged at the knees was conditional upon how often you threw one leg over the other, or forget to give them a hitch when you sat down. Do you follow me?"

"Yes, but—"

"Now, that's exactly the condition confronting a motor truck. Two cars of the same make in the same service are not necessarily going to do exactly the same amount of work, give equal service, any more than two pairs of pants cut off the same piece of goods and turned out by one tailor are going to wear exactly the same.

"There's a difference in drivers, and the care they give a machine. The duties performed, while in the main following similar lines, may vary enough to throw the best calculations out of order. Two trucks may look as much alike as two pairs of pants,

and one may last twice as long as the other, just as the fellow who only wears a suit to the office has it looking like new at the time the fellow who uses his when he cleans out the furnace and carries out the garbage has cast it into the rag bag."

"I never thought of it in just that way," mused the manager. "Some of the fellows who have tried to interest me in trucks say yes to anything I asked them, and then go me one better. And one fellow nearly got away with it, too. He'd have sold me sure as guns if I hadn't had this talk with you."

"We are not quite ready yet, but when we are you'll get the first chance."

SPEEDOMETER ACCURACY

By J. HOWARD PILE

A good many trucks are equipped with speedometer and odometers as regular equipment. As a rule these speedometers are good, accurate instruments, and with ordinary care will last a long time. As to the merits of the different types, individual owners and makers seem to differ, but the fact remains that they will both do their work if properly cared for.

A good many cars are sold with regular size tires and the speedometer and odometer readings are practically correct for this size tire. If, however, the owner changes to "oversize" tires or if his tires are worn down very much, he seldom thinks that this will make a change in the speedometer reading, but it will.

Consider for instance a car equipped with 34 x 4-in. tires, the circumference or distance around this tire is 106.8 in., therefore the wheel will make 593.3 r.p.m.; when the car is traveling at the rate of 20 m.p.h., the wheel will make 197.7 r.p.m. If a 35 x 4½-in. tire is placed on this wheel, the circumference of the tire will be 110 in.; the wheel will make 576 r.p.m. and at 20 m.p.h. the wheel will make 150.3 r.p.m. It is clearly to be seen, therefore, that by using different size tires the amount of error in speedometer and odometer readings is considerable. This same argument applies when the tires are considerably worn, as will often be the case. We have often seen tires that were worn down 2 in. in diameter less than the original. This means of course 1 in. on each side, but even this would affect the speedometer and odometer readings to a very considerable extent.

A larger size tire requires a larger size driving gear and the speedometer people will supply or recommend a proper sized gear to be used.

A rough way of testing a speedometer is by counting the telegraph poles along a railroad. These poles are placed approximately 100 ft. apart, therefore, there are fifty-three to a mile. By using a watch and counting the poles you can see roughly if your speedometer is correct. This, however, is rather a crude method, and if in doubt as to the accuracy of the instrument, better have it tested by the maker.

Pioneer Motor Truck Corporation has moved to Golden Gate Avenue, San Francisco, Cal.

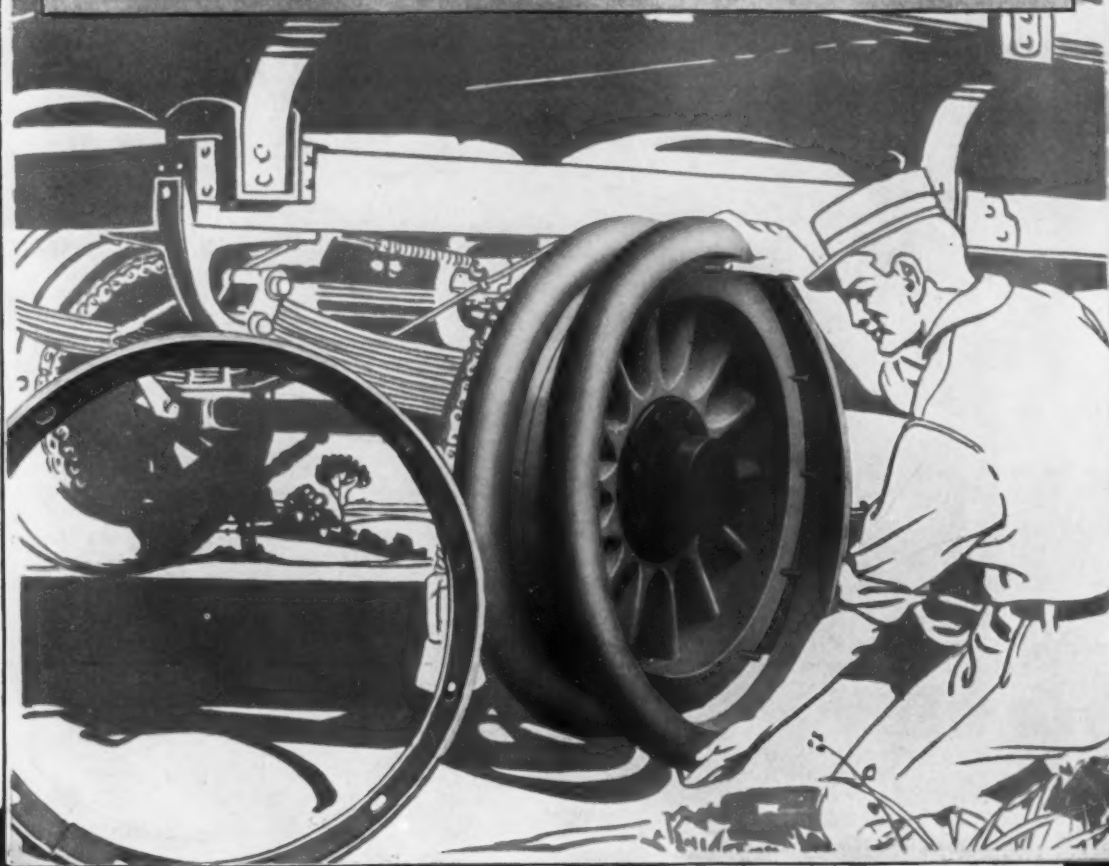


KEEP YOUR TRUCKS WORKING

The truck out of service is an investment earning no dividends.

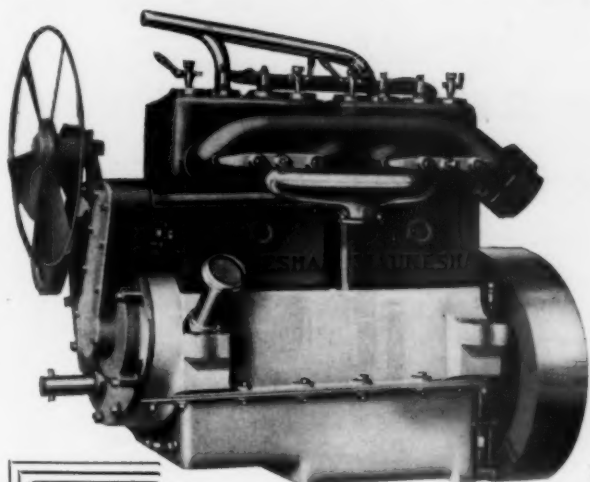
Then why equip **your** trucks with tires which mean an expensive delay every time a tire needs replacement?

UNITED STATES MOTOR TRUCK TIRES are long service equipment, but when changes **are** necessary they can be easily and quickly made in your own garage or on the road.



United States Motor Truck Tires

BRANCHES IN ALL PRINCIPAL CITIES



Did You See the
WAUKESHA MOTOR
 at the
CHICAGO SHOW?

To All Users of Gasoline Motors:

Before Contracting for Your 1914 Motor
 Requirements Find Out the Following:

1. How much repair business does the Motor Manufacturer do?
2. About what volume of replacement does he make against his guarantee?
3. What chance have you of getting repairs the day you order them?
4. If you are a Truck Manufacturer, what percentage of truck business is the Motor Manufacturer doing? And what assurance have you that you are getting a **truck** motor rather than a **pleasure car** motor?
5. Are the kind of motors you are buying being used in work similar to yours? What **proof** have you of this?

When you have gathered all this information, come to us
 and compare it with the WAUKESHA Record of Results.
 That is the only way we sell motors—ON RESULTS!
 And it's the only **right** way to buy.

We Exhibited the Following Sizes at Chicago:

| | | |
|---------|---------|---------|
| 3¼ x 5 | 4¼ x 5¾ | 4½ x 6¾ |
| 3¾ x 5¾ | 4¼ x 6¾ | 4¾ x 6¾ |

INDIVIDUAL MOTORS AND POWER PLANTS

Write for Catalog and Full Information

Waukesha Motor Co. Dept. A Waukesha, Wis.

Makers of Pleasure Car, Truck, Farm Tractor and Industrial Motors



An Exclusive Agency Means Good Profits

It's natural to hustle more when you know that all the business created in your territory is going to come to **you** and that some other fellow is not going to reap the benefits of your efforts. As a result, sales and, consequently, profits increase in proportion to the effort expended, and there is every incentive to push hard, for it means good profits.

All this is true, provided that you have a good article. Such is the case when you handle

GIBNEY WIRELESS TIRES

Here you have a product that is distinctly in advance of all competition. It is not merely theoretically good, but years of service have proved it actually good. It alone, of all wireless tires, has passed the experimental stage, for it was three years ahead and is the product of theory plus knowledge and experience. Its durability, economy, serviceability, and superiority are not something for the future to prove, but a present reality.

Gibney Wireless Tires will make money for you, because they make good for the purchaser. It will pay you to inquire about our exclusive agency proposition if we are not represented in your town.

Gibney Tire & Rubber Co., Factory, Conshohocken, Pa.
Philadelphia New York Boston Minneapolis Baltimore Washington, D.C.
Detroit, St. Louis, Mo.

The Tires That Are

**THREE
YEARS
AHEAD**



When Writing, Please Say—"Saw Your Ad. in the C C J"

The New "Little Giant" One-Ton 4-Cylinder Truck



**Here it is—the
most depend-
able one-ton 4-
cylinder truck
in existence**

Aggressive dealers are wanted to handle the Little Giant in unoccupied territory. Those who can qualify will find the connection a most profitable one. The truck is high class in every respect, the materials and workmanship being the best obtainable. It is a good seller, because it is an efficient, dependable performer and its cost of operation and maintenance is slight. Its price is very low, but its value is exceptionally great. This is made possible by the tremendous manufacturing facilities of this company.

The investment required is small, there being but one chassis, to which can be fitted any type of body. The dealer who sells the Little Giant is handling a proven truck which is known everywhere. The Little Giant is backed by an \$11,000,000.00 corporation with 20 years of manufacturing experience, and a good will represented by 22,000 satisfied customers. The dealer receives a liberal commission and sales co-operation that is unequalled.

Brief Specifications of New One-Ton Truck

MOTOR—4-cylinder, 4-cycle, $3\frac{3}{4}$ " x $4\frac{1}{2}$ ". In-closed valves, mechanically operated, located under seat.

CARBURETOR— $1\frac{1}{4}$ " Holley.

COOLING SYSTEM—Thermo-syphon.

RADIATOR—Unusually efficient, special type.

IGNITION—Low-tension Kingston; dry-cell batteries.

LEFT-HAND DRIVE—Center control.

TRANSMISSION—Selective type, three speeds forward and one reverse; Clutch, multiple disc, running in oil and attached to front of transmission case; 3-point suspension.

BRAKES—Service brake, double external contracting, operated by foot lever; Emergency, double external contracting, operated by hand lever.

CAPACITY—2000 pounds.

WHEELBASE—110 inches.

EQUIPMENT—Two oil lamps; tail lamp; tools, and electric horn and full set of mudguards furnished as chassis equipment.

Write us today for complete specifications and territory

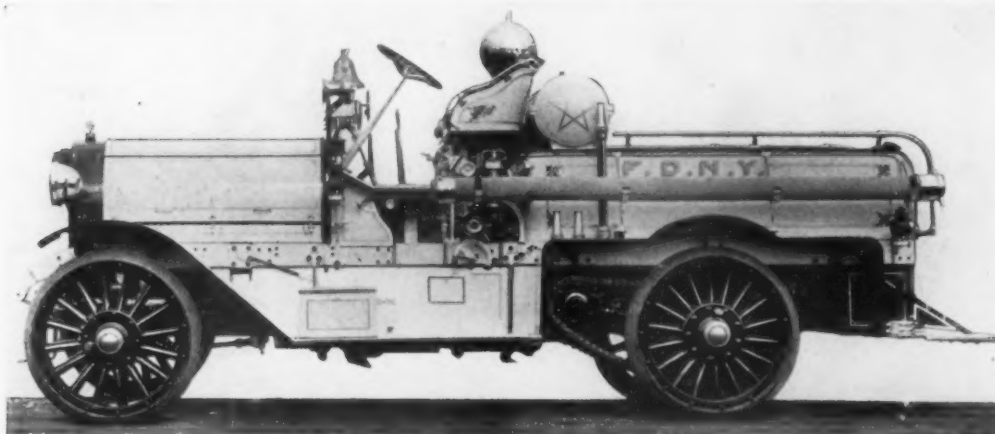
CHICAGO PNEUMATIC TOOL COMPANY

1031 Fisher Building, Chicago

Branches Everywhere

50 Church Street, New York

"BOWER SAVES POWER"



NOTT FIRE ENGINE CO.

OFFICE & FACTORY
420-1220 CENTRAL AVENUE

MANUFACTURERS

E. A. WILKINSON,
GENERAL MANAGER

UNIVERSAL STEAM FIRE ENGINES

(HORSE DRAWN AND MOTOR PROPELLED)

AUTO COMBINATION MOTOR PUMPING ENGINES

MINNEAPOLIS, MINN.

November 20th,
1913.

Bower Roller Bearing Co.,
Detroit,
Mich.

Gentlemen:-

Your letter by Mr. D. F. Graham, Sales Manager, of November 18th, received, and I am sending you a much better out of our motor fire engine.

This machine is built in two sizes - four and six cylinder construction - from 600 to 900 gallons capacity. Two of these machines have just been delivered to the New York Fire Department and put in service there.

The weight of this machine - in the four cylinder construction is - 12,300 pounds, in the six cylinder 14,360 pounds, each of which are equipped with your Bower roller bearings, and as before written you, we have never had any trouble with these bearings, in fact, we do not know that we have roller bearings in the machine.

You could write your own recommendation, as far as we are concerned, and we would be willing to sign it, and there never was any machine abused any harder than this machine - particularly in demonstrating, where speed and staying qualities were the principal consideration.

Yours very truly,
NOTT FIRE ENGINE CO.

Per

E. A. Wilkinson
General Manager.

NOTICE: The Bower Roller Bearing is patented in the United States and foreign countries. Infringers of our patent right to make, use, vend or sell will be duly prosecuted.

BOWER ROLLER BEARING CO.

DETROIT, MICH.



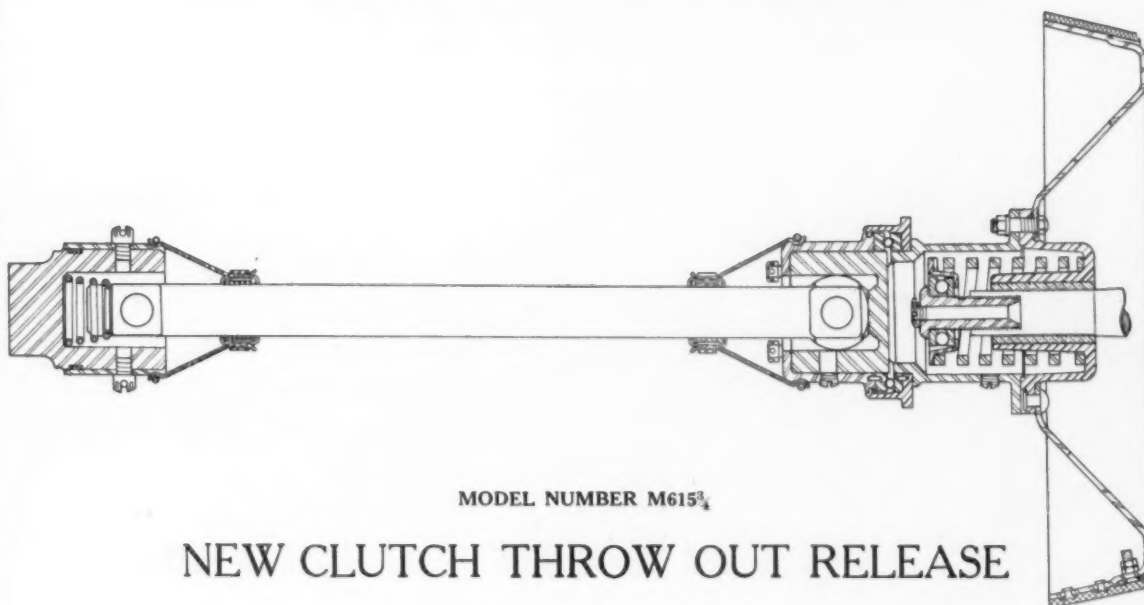
ONE 3 THIRD

**OF ALL THE ELECTRIC TRUCKS
AND DELIVERY WAGONS IN THE COUNTRY
ARE *EQUIPPED WITH THE*
EDISON STORAGE BATTERY**

Five years ago we entered the race—against competition of ten to fifteen years
standing. **TO DAY WE WIN**

EDISON STORAGE BATTERY CO., 141 LAKESIDE AVE.
ORANGE, N. J.

THE NEW 1915 HARTFORD CLUTCH



MODEL NUMBER M615 $\frac{1}{2}$

NEW CLUTCH THROW OUT RELEASE

Ten Less Repair Parts Than in Former Construction

Write for Blue Prints

2187-2188

2185-2189

CLUTCHES FOR UNIT POWER PLANT - - CLUTCHES FOR INDEPENDENT CONSTRUCTION

Hartford Auto Parts Company

Sales Office:
DETROIT, MICH.

F. GEORGE WALKER
Sales Manager

Factory:
HARTFORD, CONN.

When Writing, Please Say—"Saw Your Ad. in the C C J"

Flint

DEALERS LOOK!!

Model "C"
1600 to 2000 lbs. Capacity
DOUBLE REDUCTION
(7 to 1) REAR AXLE



New 1914 Prices

| | | | | | | |
|---------|---|-----------------|-------------|-----------|-----------------|-----------|
| CHASSIS | { | 34" x 3" Front | Solid Tires | \$1285.00 | | |
| | | 34" x 3½" Rear | | | | |
| | | 34" x 4½" Front | | | Pneumatic Tires | \$1370.00 |
| | | 35" x 5" Rear | | | | |

COMPLETE CAR, Painted and Trimmed, with Body,
\$80.00 to \$175.00 additional, according to type of body

Flint Motor Wagon Department

DURANT-DORT CARRIAGE CO.

FLINT, MICHIGAN

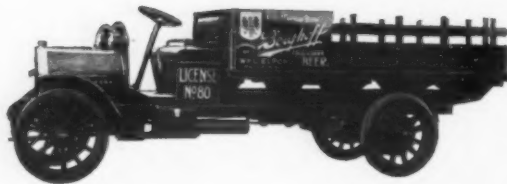
Flint

What Is Your Proposition
to Dealers?

When Writing, Please Say—"Saw Your Ad. in the C C J"

Standard Highland Bodies

For Motor Trucks



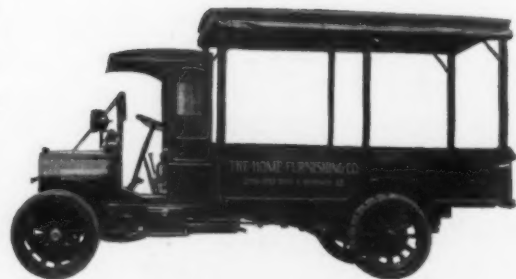
Our production facilities are so ample and complete that you can not only procure the most desirable body in the quickest time and at the lowest cost, but the wide range of types enables the car builder to procure from this line the right body for every business. We make 38 sizes of Flare Board and 27 sizes of Stake Bodies in addition to Furniture and various other types of bodies

**For Economy, Service
and Durability Get
Highland Bodies**



Highland Bodies are standard for motor trucks because they have proved to be the best from the standpoints of efficiency and durability; because they are made, not by wagon builders, but by engineers who know the severe service motor truck bodies must withstand and design accord-

ingly; because by standardization we have not only made better bodies, but reduced the cost below those distinctly inferior; because they have proved superior from every practical standpoint.



Our Catalogue and Price List Should Be With You Always

The Highland Body Mfg. Co.
Cincinnati Ohio

When Writing, Please Say—"Saw Your Ad. in the C C J"

FEDERAL

Why the Federal in Your Line?

The proven adaptability and efficiency of the Federal in more than 120 different lines, and for more than three years, are, in themselves, sufficient reasons.

The wide distribution of the Federal, from coast to coast, in Alaska, Cuba, Porto Rico, the Philippines, the South American Republics, Australia, Portugal and India, confirms the correctness and soundness of Federal design and construction.

The fact that the largest users of motor trucks in the world operate fleets of Federals.

The fact that when another year rolls 'round, the owner of a Federal will have a truck that will still be backed by one of the most responsible organizations in the industry—a truck that will not have deteriorated in value or desirability, either because the maker has gone to the industrial graveyard, or because the truck itself has been forced to the bargain counter.

Consider these facts carefully, for the *right* motor truck will be of wonderful help in your business; but be sure it is the right truck.

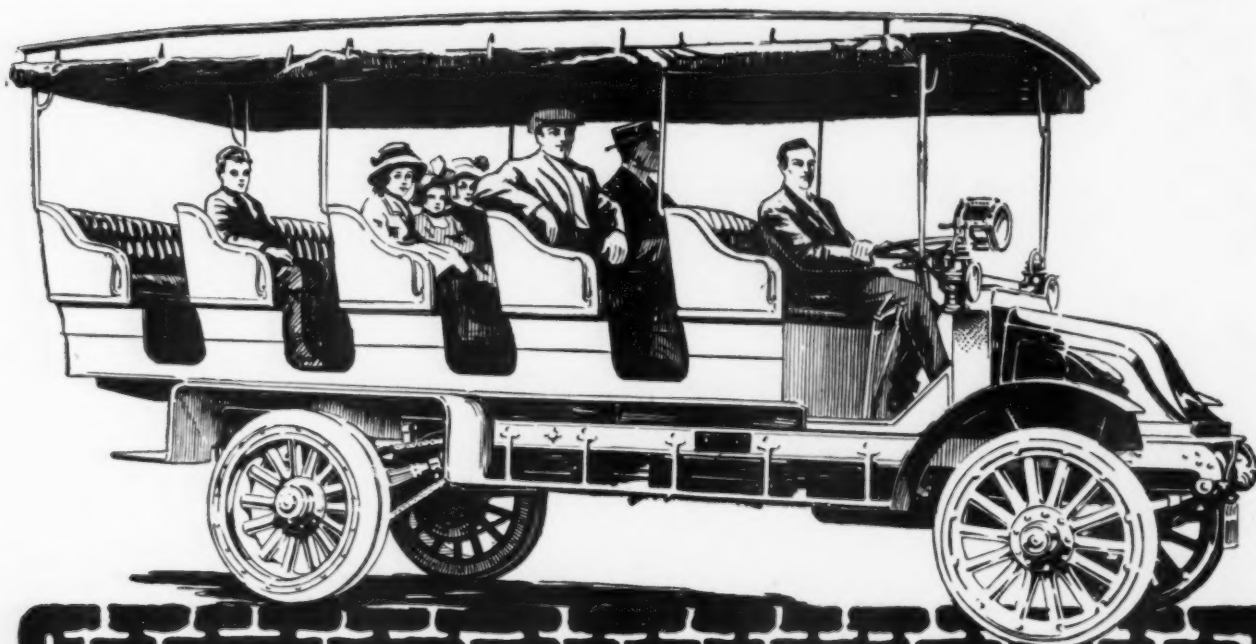
Illustrated literature will be sent upon request.

PRICE
Includes Seat Lamps,
Tools, etc.

\$1800
F.O.B. DETROIT

Body Extra
Built to meet individual
requirements

Federal Motor Truck Company
Detroit, Michigan.



THE ADAMS

One Ton—Chassis—
\$1850

Also built in 1½ and 2 ton capacities

Coincident with this notable price reduction, made possible by greatly increased manufacturing operations, two important changes in the construction of the Adams line are announced:

Adams Trucks—all models—are now fitted with Continental Motors.

Timken Axles and Bearings are used throughout.

Adams staunchness, simplicity and complete reliability have long been recognized.

By the addition of the thoroughly standardized high-grade features named above, and other minor improvements, Adams Trucks show an excess in value which will instantly be recognized both by dealer and owner.

Dealer contracts for 1914 are now being made, and we will consider applications where we are not now represented. Write or wire at once.

The Adams Bros. Co. 438 West Main Cross
 FINDLAY, OHIO

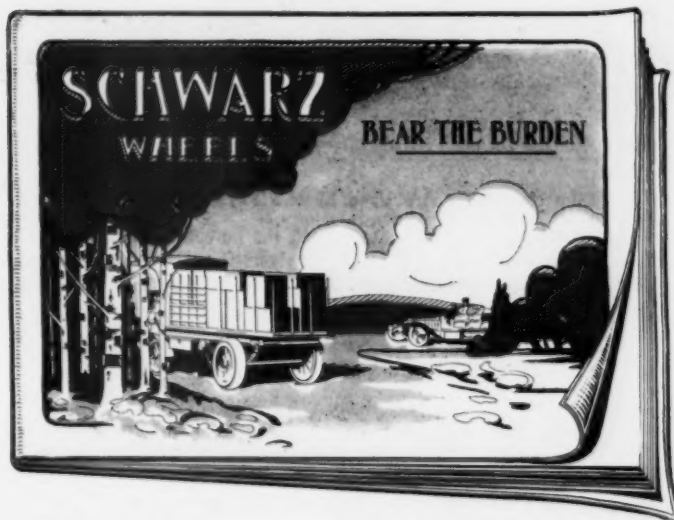
First American Truck Manufacturers to use the French type of hood; with radiator at rear of motor

Bodies made in all styles, to suit any industry

SCHWARZ WHEELS

These are the wheels that are found on practically all the pleasure cars and trucks where quality is the first consideration.

If you want to know why designers, engineers and makers insist upon Schwarz Wheels, send for this booklet—



It gives an interesting and graphic account of the requirements demanded of wheels for automobiles and trucks; why ordinary wheels are not satisfactory; how Schwarz Wheels differ from all others, and a detailed description of the distinctive Schwarz patent method of construction which makes them the strongest, safest, most economical wheels made.

The Schwarz method is so radically different from other methods that there is no middle ground—it must be either right or wrong. That it is right is proved by tests, service, the verdict of engineers and designers and the adoption of Schwarz Wheels on nearly every quality car and truck built. If, for any reason, they are not in use on your product, it behooves you to study carefully the reasons that impelled others to select SCHWARZ WHEELS.

When you buy a Motor Vehicle see that it is Schwarz-Equipped.

The Schwarz Wheel Co.

Frankford, Philadelphia, Pennsylvania

Satisfied Standard Truck Owners from Coast to Coast Are the Most Convincing Proof of Standard Quality Which Can Be Submitted



Three Standards Like the Above Are Used by the Taylor Ice Cream Co., Buffalo, N. Y.

A prominent manufacturer on the Pacific coast contemplated the purchase of a **Standard truck**. Deciding to investigate the satisfaction **Standard trucks** were giving to owners throughout the country, he procured the address of a large number, and **propounded the following questions to them:**

1. We would like to know how long you have been using your Standard truck.
2. What capacity truck you are using.
3. The nature of the roads this truck is used over and the average load and tonnage per day it is carrying.
4. Have you other trucks in use?
5. How does the Standard truck compare, in your judgment, with other trucks?
6. Have you noticed any weak points in its construction? If so, please advise us what they are?
7. Have you noticed any particularly good points in this truck which are not on other trucks?
8. If you were purchasing a new truck, would you purchase another Standard make?
9. What fuel are you using in it? Do you consider it as economical in the use of gasoline or distillate as other trucks?
10. Any other information you can give us will be greatly appreciated.

Here is the reply of one owner who is operating Standard trucks:

1. Since February 1, 1913, we have done about seven thousand (7000) miles with the original spark plugs and tires; have not missed one day—seven days a week, and have made practically no adjustments except lengthen radius rods to take care of stretch in chains.
2. Three (3) ton Standards—three trucks.
3. Our streets in Buffalo are very good, mostly asphalt and not many hills. We have had as high as six (6) tons on this make of truck, and run it to Niagara Falls, twenty-eight miles, just as easy as a three-ton load.
4. We have ten cars in use in our business. The Standard three tons are the largest trucks we use.
5. Before buying, the writer visited quite a number of factories, saw them under construction, looked over the forgings, and accessories, and would have bought the Standard, even if they had cost as much as some of the complicated junk which some people call trucks.
6. Not one thing has happened to lead us to believe the truck has any weakness.
7. Continental motor and governor, used them three years, dry Raybestos-faced clutch. Brown-Lipe transmission, unit power plant, Timken axles and bearings, Automatic magneto.
8. Yes.
9. Gasoline—we are getting about six miles to gallon on straight running, less when in the crowded section downtown. One quart oil every forty to sixty miles.
10. Hope this information will be of some help to you in deciding your truck problem, and feel sure you can do no better than buy a Standard if you use a truck of that capacity.

TAYLOR ICE CREAM COMPANY

Perhaps you would be interested in knowing just what others, in **all lines of trade** have said. Write today.

DEALERS: The satisfied truck owner is your greatest asset, your most convincing salesman, and your best insurance of a permanent position in the industry in your locality. To secure him, get in line for 1914 with the **Standard Truck Agency** in your territory—TODAY.

STANDARD 3 tons capacity **MOTOR** Chassis \$2750.00 **TRUCK COMPANY**

DETROIT, MICHIGAN, U. S. A.

FOREIGN DEPARTMENT

R. M. Lockwood, Mgr., 18 Broadway, New York City.

When Writing, Please Say—"Saw your Ad. in the C C J"

Take New York for Instance—



A Fleet of "Electrics" owned and operated by The American Express Co.

This is a photograph of a fleet of electric delivery wagons in the service of The American Express Co. in New York City. This company operates in New York 84 Electric Vehicles equipped with "Ironclad-Exide" Batteries. The National Express Co. has 11 "Electrics", and the Wescott Express Co. has 15 "Electrics" in New York City equipped with "Ironclad-Exide" Batteries.

The Jacob Ruppert Brewing Co. of New York City, one of the largest users of electric trucks in New York, has 23 trucks equipped with "Ironclad-Exide" Batteries and 12 trucks equipped with "Exide" Batteries.

George Ehret, another of the largest brewers in New York City, and one of the first brewing companies to adopt "Electrics", has 19 trucks equipped with "Ironclad-Exide" Batteries.

The Central Brewing Co.; Lower's V. Gambrinus Brewing Co.; Bernheimer & Schwartz; Otto Huber—these are other brewers in New York City using various types of "Exide" Batteries.

The New York Edison Company has 110 electric vehicles equipped with various types of the "Exide" Batteries.

The United Electric Light & Power Co., of New York City, operates 7 "Electrics" of varying capacities, equipped with the "Ironclad-Exide" Battery.

New York City has hundreds of other electric vehicle users—both commercial and pleasure—who are receiving excellent service from either "Exide", "Hycap-Exide", "Tbin-Exide" or "Ironclad-Exide" Batteries.

Let us refer you to the owners of "Electrics" in your town who are using "Exide" Batteries, and let us help you in choosing the proper battery for your service.

THE ELECTRIC STORAGE BATTERY CO.

Manufacturer of The "Chloride Accumulator," The "Tudor Accumulator," The "Exide," "Hycap-Exide," "Tbin-Exide," and "Ironclad-Exide" Batteries.

New York Boston Chicago PHILADELPHIA, PA. Denver San Francisco Seattle
St. Louis Cleveland Atlanta Detroit 1888-1914 Los Angeles Portland, Ore. Toronto
886 "Exide" Distributors 9 "Exide" Depots "Exide" Inspection Corps

PRICES

THAT GET THE BUSINESS



Gasoline Chasses

| Model | Capacity | Old Price | New Price |
|-------|----------------------|-----------|-----------|
| VC | 1 $\frac{1}{4}$ tons | \$1900 | \$1500 |
| SC | 2 " | 2600 | 1900 |
| H | 3 $\frac{1}{2}$ " | 3250 | 2250 |
| HU | 3 $\frac{1}{2}$ " | 3500 | 2500 |
| K | 5 " | 4250 | 2750 |
| KU | 5 " | 4500 | 3000 |

Electric Chasses

| | | | |
|----|-----------|--------|--------|
| 1 | 1000 lbs. | \$1400 | \$1200 |
| 2 | 2000 " | 1500 | 1300 |
| 3 | 3000 " | 1700 | 1450 |
| 4 | 4000 " | 2000 | 1650 |
| 6 | 6000 " | 2300 | 1900 |
| 8 | 8000 " | 2650 | 2100 |
| 10 | 10000 " | 2950 | 2350 |
| 12 | 12000 " | 3200 | 2500 |

Terms net cash F. O. B. Pontiac

These prices are made possible by our new policy, which became effective January 1, 1914.

We made the first successful truck.

We are the first to offer trucks to buyers on a RIGHT business basis.

We offer a red-hot, money-making proposition to any man with transportation problems.

We make a truck to fit YOUR business.

GENERAL MOTORS TRUCK COMPANY

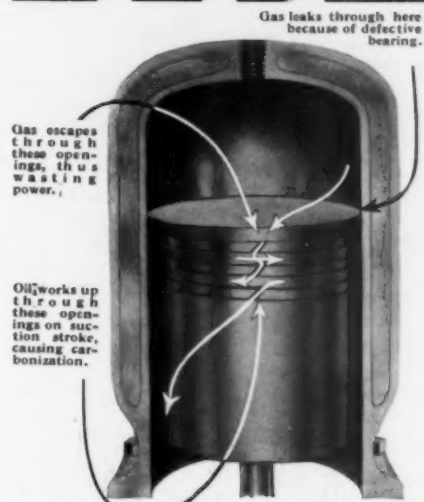
PONTIAC MICHIGAN

One of the units of the GENERAL MOTORS CO., the largest builders of automobiles in the world

Branches:—New York Boston Philadelphia Detroit Chicago Kansas City St. Louis

When Writing, Please Say—"Saw Your Ad. in the C C J"

It's Little Things Like Leaky Piston Rings That Are Big Things in Cost of Truck Operation



This is how you lose power



This is how you obtain full power



This is the construction which enables you to do it

Many a man buys a truck and is disappointed because operating costs are higher than expected. They don't realize that attention to little things keeps down the cost—neglect of them runs it up. Some troubles are easily located and quickly remedied. Little things are allowed to slide because they don't seem important, but in the aggregate they are very costly.

Take piston rings for instance. The conventional type of ring, no matter how well made, will permit the power-producing vapor to escape from the combustion chamber, as shown in the illustration. The opening necessary to permit expansion cannot be completely closed and vapor can and does work down on the compression stroke, while at other times oil from the crank case works up through the same openings into the combustion chamber.

The one wastes fuel, causes poor compression and decreased power; the other causes carbonization with consequent loss of efficiency.

These costly faults of construction are overcome in



PISTON RINGS

These are so made that vapor cannot escape from or oil work up into the combustion chamber. The result is you use less gasoline, get a full charge, perfect compression and increased power, eliminate much of the carbonization which impairs the efficiency of your engine, and retain the roundness of your cylinders.

That is a plain, truthful statement of what **Leak-Proof Piston Rings** do. This is *why* they do it. They are made in *two pieces* of special gray iron having perfect elasticity. The point of expansion in each piece is opposite that of the other, thereby giving equal pressure around the cylinder walls. Each half carries a flange covering the opening in the other half, as shown in the illustration, thus leaving no possible chance for the escape of power.

You need **Leak-Proofs** for the economical operation of your truck. If the foregoing is not sufficiently convincing

"Ask the User"

There are over 180,000 of them who will give you an enthusiastic confirmation of our statements.

McQuay-Norris Mfg. Co., Dept. C

1309 Chestnut St.

NEW YORK, N. Y.
Room 33, Lincoln Sq. Court
44th and Broadway

CHICAGO, ILL.
Suite 39, Merchants Bldg.
106 N. La Salle St.

BRANCH OFFICES:

PITTSBURGH, PA.
7629 Tioga St.

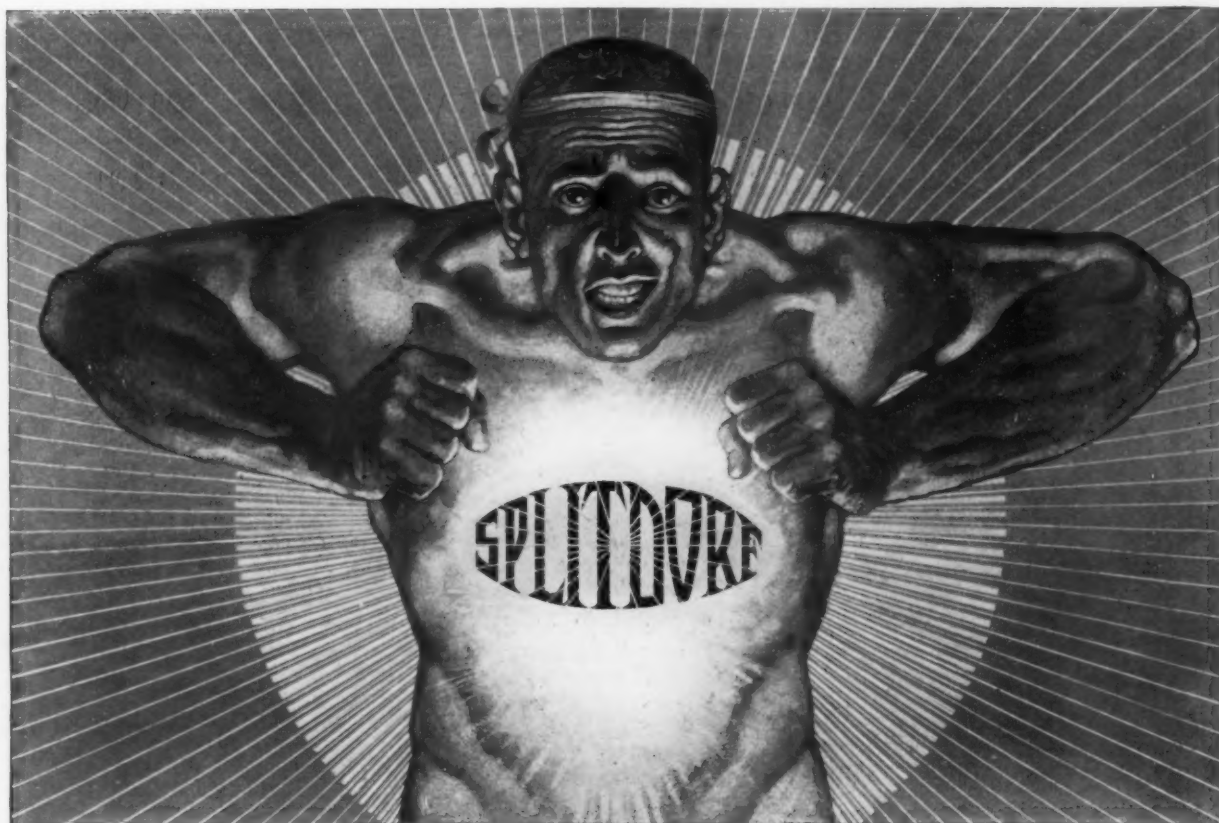
KANSAS CITY, MO.
1904 Grand Ave.

LOS ANGELES, CAL.
224 Central Bldg.
6th and Main Sts.

St. Louis, Mo.

SAN FRANCISCO, CAL.
268 Market St.

CANADA—W. H. Bowfield, 120 Adelaide St., W., Toronto



THE SPLITDORF ELECTRICAL COMPANY faces the ignition problems of the future with the confidence of a rejuvenated giant girded to accomplish the most herculean tasks—

with stronger frame as represented by vastly improved manufacturing methods and greatly augmented manufacturing facilities—

with a keener head and riper knowledge—thanks to accumulating years of hard practical experience—

with sinews and muscles of greater suppleness and strength owing to the enjoyment of unlimited financial resources—

with more far-reaching arms as indicated by the ever-increasing number of branch houses and distributing centers—

with a heart more insistent than ever to

render real service to the consumer at thoroughly equipped service stations—

with a mind bent upon supplying ignition units of magnetos, plugs, transformers, coils, lighting and starting outfits, etc., better in design, in material, in manufacture and in everyday usage than the best—

and with a perfectly healthy system that is the real foundation of the success of SPLITDORF controlling interests—an organization drilled and trained and geared like a wonderful piece of machinery—a vital, breathing, insistent force, irresistible in its confidence, strength, intensity and loyalty.

A full line of SPLITDORF up-to-the-minute magnetos, transformers, plugs, electric lighting and starting outfits, etc., on exhibition at Chicago Show, Coliseum and Armory. Spaces 56 and 73

SPLITDORF ELECTRICAL COMPANY

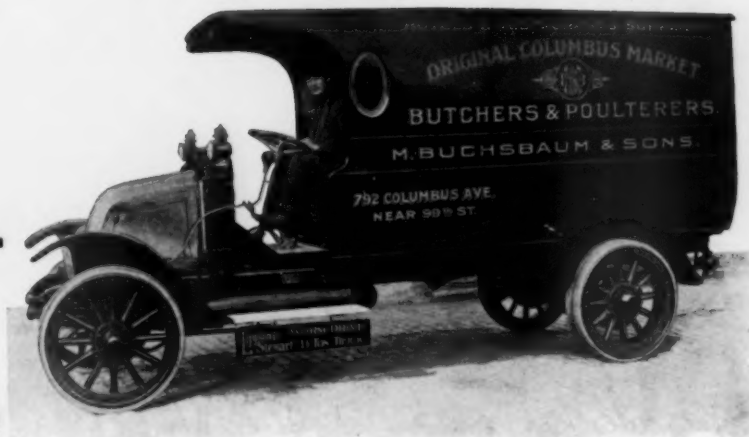
Factory: NEWARK, NEW JERSEY

Silent

Lippard-Stewart

Powerful

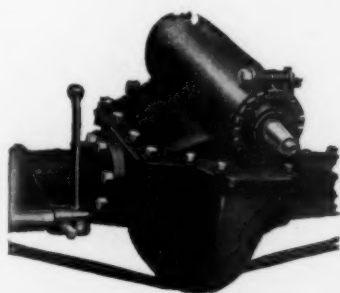
Worm and Gear—the Economical Drive



THE smoothness and quietness, the apparent gliding over the road without effort, with which Lippard-Stewart trucks go about their work, are in direct contrast to that grinding, rattling, jerky motion of some motor trucks. The truck that goes clattering by your door is not an economical truck. The noise and unsteady operation is wear getting in its work, and wear means waste. Elimination of this waste is vital—but how? There is a way—the Lippard-Stewart is the solution.

What Worm Drive Does

The silence of Lippard-Stewarts is an indication of the care taken in their building throughout. But in the drive system, which has the hardest work to do, lies the



necessary, strains are lessened, flexibility is secured, the truck does not tear itself apart.

best proof that wear and tear is cut down to the last notch. Through the Lippard-Stewart worm drive, power is applied with such steadiness that shocks disappear. The natural result is that breakages are uncommon, adjustments are un-

Getting the Most for the Money

When you stop to think that sprockets and chains deliver to the rear wheels only about 85% of the motor power, and that the best obtained from other types of drive is on an average 90%, it is plain that the 97% efficiency of the worm and gear makes every turn of the motor count for all that can be got out of it. The 7% to 12% of power saved means that much less gasoline to run the truck, an economy that holds good throughout the life of the truck.

Quality from End to End

Lippard-Stewart trucks with worm drive exemplify up-to-dateness. Complicated jack shaft and chains, and bulky double reduction axles have become back numbers. Of Timken-David Brown manufacture, the Lippard-Stewart rear axle gives results that line up with the experienced user's ideas of profitable truck operation. From end to end the same endurance, ample ability and high quality are built into Lippard-Stewart trucks—facts proved by specifications. Write for them.

Lippard-Stewart trucks are furnished in two capacities—1½ ton chassis, worm drive, \$2300; 1500 lb. chassis, bevel drive (pneumatic tires), \$1650, worm drive (solid tires), \$100 extra. Bodies for various purposes.

Dealers: Business men are buying Lippard-Stewart trucks because they can better their trade conditions and save money. Consider the possible one-car sales, quantity lots to a single firm, repeat orders, all-the-year-round buying interest, and the strictly dollars and cents basis for business development. The possibilities are great—grasp the chance.

LIPPARD-STEWART MOTOR CAR CO.
1737 ELMWOOD AVENUE, BUFFALO, N. Y.

Designed and Built to Withstand Vibration

—to faithfully perform its duties of checking-up mileage and supply the unit whereby gasoline or battery consumption, tire mileage, lubricating expense and depreciation ratio can be figured *to a certainty*, under the terrific stress of shocks, jolts and jars to which the commercial wagon of today is subjected—this is the new Model K

Veeder HUB ODOMETER



No springs are used in the mechanism—friction has been reduced to a minimum—the most constant wearing parts have been made of hardened steel—dials and interlocking gears are of brass or bronze—figures on the dials are of fused porcelain enamel—bearings allow no passage of axle grease—casing of $\frac{1}{4}$ " drawn brass—crystal set in watertight casing—making a

COMPACT, RUGGED, DURABLE INSTRUMENT

Remember, VEEDER HUB ODOMETERS register forward, whether the car runs forward or backward, and consequently gives an infallible reckoning upon which to base the all-important cost of operation.

Also, VEEDER HUB ODOMETERS can't be fooled—they can't be disconnected by slipping gears out of mesh—your driver can't subtract mileage by running the wheels backward or falsify returns by putting the odometers out of service during a run. Any tampering with the instrument, which is sealed on the hub, leads to certain detection.

If in any way interested in the cost of operation of commercial cars, send for information.

Neat, durable and compact, the VEEDER HUB ODOMETER can be easily attached. Price complete **\$20.00**

AT YOUR DEALER'S, DIRECT FROM THE FACTORY, OR AT THE FOLLOWING AGENCIES:
T. H. CRANSTON & CO., 56 E. Randolph St., Chicago, Ill. BERNARD I. BILL, 543 Golden Gate Ave., San Francisco, Cal.

The Veeder Manufacturing Company

C. H. VEEDER, President

H. W. LESTER, Secretary

D. J. POST, Treasurer

HARTFORD, CONNECTICUT

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings

When Writing, Please Say—"Saw your Ad. in the C C J"



TRADE-MARK

The KRAMER GOVERNOR

"Pefection in Regulation"

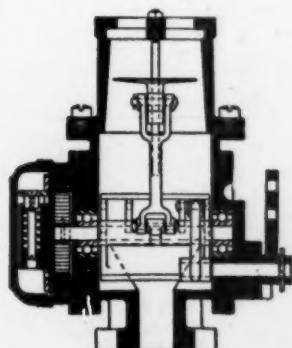
The Kramer Governor is an instrument that automatically controls and maintains a constant speed

of an internal combustion engine by governing the velocity of the inflowing gases, in this respect differing from any governor manufactured.



Showing how the KRAMER Governor is attached to motor

This instrument is easily applied to all motors, inasmuch as it has no revolving parts nor is it connected with any of the moving parts of the motor.



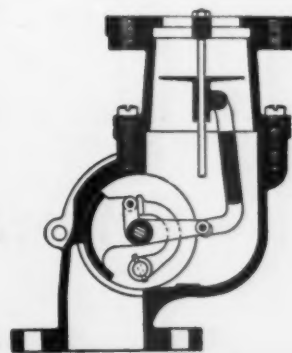
Lateral Section

We solicit inquiries from responsible makers of commercial cars and motors.

B.G. Kramer Co.

Manufacturers

Milwaukee, Wis., U.S.A.



Longitudinal Section

ONE HUNDRED AND FOURTEEN G.V. ELECTRICS
 HELPED THE AMERICAN EXPRESS COMPANY TO
 BRING CHRISTMAS CHEER TO MILLIONS. HERE
 ARE TWO OF TWENTY-EIGHT IN BOSTON. OVER
 THREE HUNDRED IN EXPRESS BUSINESS.



GENERAL VEHICLE COMPANY, INC.
 LONG ISLAND CITY, NEW YORK

PHILADELPHIA

BOSTON

CHICAGO

NEW YORK





Endurance Contests that Count

THE daily pull of service, the hauling of heavy loads wherever the demands of business require, the hum-drum performance of routine duties and the occasional extraordinary ordeal of bad roads and heavy grades, these are the contests that really determine the relative efficiency of motors and of motor driven vehicles.

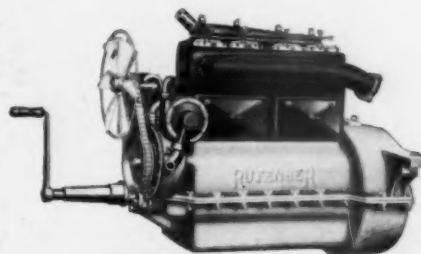
THE RUTENBER MOTOR

not only carries its cars to cup winning records on exhibition runs, but in the daily round of duty, in trucks, commercial cars and pleasure vehicles, it demonstrates its supremacy. Rutenber Fours and Sixes will be found doing ungrudgingly the work that other motors dare not attempt. And it is because the Rutenber has consistently rendered this kind of service for so many years that discriminating buyers select cars that carry the Rutenber.

The slightly higher price of the Rutenber Six, 1914 Motor, as compared with other sixes makes possible a degree of efficiency otherwise unattainable.

Write for the Rutenber Book

RUTENBER MOTOR COMPANY
MARION INDIANA



En Bloc. 4 Cylinder. Model 27.

ONE HUNDRED AND FOURTEEN G.V. ELECTRICS
 HELPED THE AMERICAN EXPRESS COMPANY TO
 BRING CHRISTMAS CHEER TO MILLIONS. HERE
 ARE TWO OF TWENTY-EIGHT IN BOSTON. OVER
 THREE HUNDRED IN EXPRESS BUSINESS.



GENERAL VEHICLE COMPANY, INC.

LONG ISLAND CITY, NEW YORK

BOSTON

PHILADELPHIA

CHICAGO

NEW YORK





Endurance Contests that Count

THE daily pull of service, the hauling of heavy loads wherever the demands of business require, the hum-drum performance of routine duties and the occasional extraordinary ordeal of bad roads and heavy grades, these are the contests that really determine the relative efficiency of motors and of motor driven vehicles.

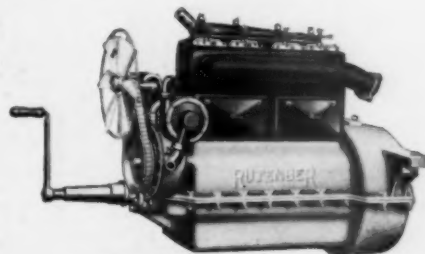
THE RUTENBER MOTOR

not only carries its cars to cup winning records on exhibition runs, but in the daily round of duty, in trucks, commercial cars and pleasure vehicles, it demonstrates its supremacy. Rutenber Fours and Sixes will be found doing ungrudgingly the work that other motors dare not attempt. And it is because the Rutenber has consistently rendered this kind of service for so many years that discriminating buyers select cars that carry the Rutenber.

The slightly higher price of the Rutenber Six, 1914 Motor, as compared with other sixes makes possible a degree of efficiency otherwise unattainable.

Write for the Rutenber Book

RUTENBER MOTOR COMPANY
MARION INDIANA



En Bloc. 4 Cylinder. Model 27.

CRAMP

Gear-Bronzes



The Car Manufacturer, to put his product head and shoulders above the general run of makes on the market, must have distinctive features in his car and features with reputations of the best.

The Worm-Drive has caused more discussion than any other feature introduced in the industry in the last few years. It is no longer an experiment, as its performance has shown it to be the best type of drive—less power loss, less friction and less noise.

The Car Manufacturer adopting this type of drive with CRAMP BRONZE WORM WHEEL and Steel Worm will attract attention immediately. He will be the forerunner of what will eventually be universally adopted and he will be able to connect with his product a name that is known over the entire world—

CRAMP

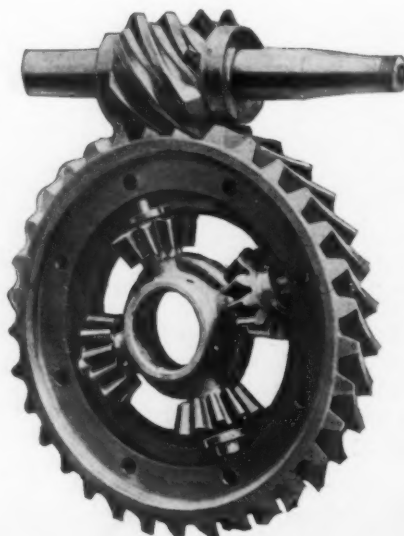
Every nation on the face of the entire globe has endorsed CRAMP METALS, and when the United States Government designed the stupendous Panama Lock Gates, requiring enormous gearing and training, it unhesitatingly specified CRAMP METALS.

We have been making WORMGEARS for over sixty years—our first gears are still in service. This WORM-GEAR knowledge, backed by a hundred years of experience in manufacturing metals, guarantees the Car Manufacturer a feature, the prestige of which alone will increase his sales and put his car in the limelight of the buying public.

Write us about it.

There is no necessity of your importing metals, it costs you money and time. The very metals you would import are those that have been discarded in foreign countries in favor of CRAMP METALS.

CRAMP METALS are used over the entire world.



The William
Cramp & Sons
Ship & Engine
Building Co.

Philadelphia
Pennsylvania

When Writing, Please Say—"Saw Your Ad. in the C C J"



Hustling baggage—

Careful handling of this 1½-ton Commercial Truck owned by the Union Transfer Co., Washington, D. C., has enabled them to get an unusual mileage from their

GOODRICH WIRELESS TRUCK TIRES

This truck went to work June, 1911. By the time all four of the tires had been renewed, they had averaged 18,500 miles each, the lowest mileage made by any tire being 12,959 miles. The rear tire shown in the picture has gone 12,000 miles and the front 4,000.

What Goodrich Wireless Tires are doing for the Union Transfer Company, they will do for you

Factories:
Akron, Ohio

The B. F. Goodrich Company

Branches in All
Principal Cities



When Writing, Please Say—"Saw Your Ad. in the C C J"

The Stewart Hub Odometer

Checks and Cuts Motor Delivery Faults

WHEN you buy your trucks, you cannot buy with them the proper plan on which to operate them in **your** service—because **no one plan** will fit any **two** services.

You must start operating **your** motor trucks on a system of **your own devising** for **your own needs**—and then let the Stewart Hub Odometer tell you the flaws. Then, **and only then**, can you put your motor delivery on a sound, practical, **profitable** basis.

The Stewart Hub Odometer reduces everything to miles—the standard of measurement being “cost per ton per mile.” Motor trucks are more expensive than teams unless your trucks are driven more **miles** each day. It shows that you are paying too much for tires unless they go the full guaranteed 8,000 **miles**. It tells you whether you are getting the number of **miles** you should out of each gallon of gasoline and oil. It indicates the carefulness and skill of your drivers by setting the value on their labor in **miles**.

With all costs and performances reduced to a **mileage** basis, you can then detect where your motor delivery is wrong, and so know where to set it right. This is not just the easiest way—it is the one and **only** way.

And the Stewart Hub Odometer is the only instrument to do this because it is the one **reliable** instrument. It has no frailties. It has no complications. It operates without possibility of error because it has no

uncertain springs, pawls and ratchets, but is driven by **worm** and **spiral gears**. The solid brass dials are absolutely controlled by our Geneva stop mechanism. This allows only the right dial to move at the right time. Every dial is locked except when it is registering.

No other similar instrument ever made has been mud, oil and waterproof as the Stewart Hub Odometer is. It is impossible of operation by anything except the wheel of the hub it is on. It registers to 100,000 miles and tenths of a mile, and then repeats.

To operate your motor trucks at a profit you must act on exact mileage information. The Stewart Hub Odometer gives you this exact information any minute of any day, and you can depend absolutely upon it for unfailing accuracy.

Equip all your motor trucks with Stewart Hub Odometers—and be sure that all the **new** trucks you buy are all equipped with them when delivered.



A sturdy, slightly instrument that can be fitted to the hub of any truck or electric pleasure car. It registers to 100,000 miles in tenths, and repeats. The numerals are large, clear and easy to read. Their answer is always summed up. The mechanism is fully protected.

\$ 15

Complete

An interior view of the Stewart Hub Odometer. Note its simplicity and strength. This shows the solid brass dials on their special shaft, the positive drive and our Geneva Stop Principle, which moves and locks the dials with never-failing precision. There can be no error.



Stewart-Warner Speedometer Corporation

FACTORIES: Chicago, Illinois and
Beloit, Wisconsin

Direct Factory Branches:

Atlanta, Ga.
Boston, Mass.
Buffalo, N. Y.

Chicago, Ill.
Cleveland, Ohio
Detroit, Mich.

London, Eng.

Indianapolis, Ind.
Kansas City, Mo.
Los Angeles, Cal.

Minneapolis, Minn.
New York, N. Y.
Philadelphia, Pa.

Pittsburgh, Pa.
St. Louis, Mo.
San Francisco, Cal.
Paris, France

And 75 Service Stations

When Writing, Please Say—"Saw Your Ad. in the C C J"



BOWSER

SAFE OIL STORAGE SYSTEMS

The stamp of approval of Insurance Companies and Fire Prevention Bureaus has been placed on the Bowser Storage Systems, because they are built to conform to that measure of safety prescribed by the National Board of Fire Underwriters and are so labeled.

When to these two highly desirable considerations you add the long-established facts that the BOWSER SYSTEM prevents evaporation and gives you clean, full-strength, accurately measured gasoline, you have every "why and wherefore" needed to convince a practical, reasonable man, that the Bowser Storage System should be installed in his garage without further delay.

Above-ground storage of gasoline and oil is not only dangerous, causing a high rate of insurance, but it results in a loss of power, the addition of impurities, and a higher mileage upkeep.

When considerations of safety, economy and service all point the same way, it is high time to obey their injunctions and install a BOWSER SYSTEM. Many, many others using our outfits have substantiated these facts. **Prices, sizes, styles** to exactly meet your needs.

To learn how you can daily save money on a small investment send for our interesting booklet. It's free. Writing will not obligate you in the least.



S. F. BOWSER & CO., Inc.

Home Plant and General Offices, Box 2118, Fort Wayne, Ind., U. S. A.

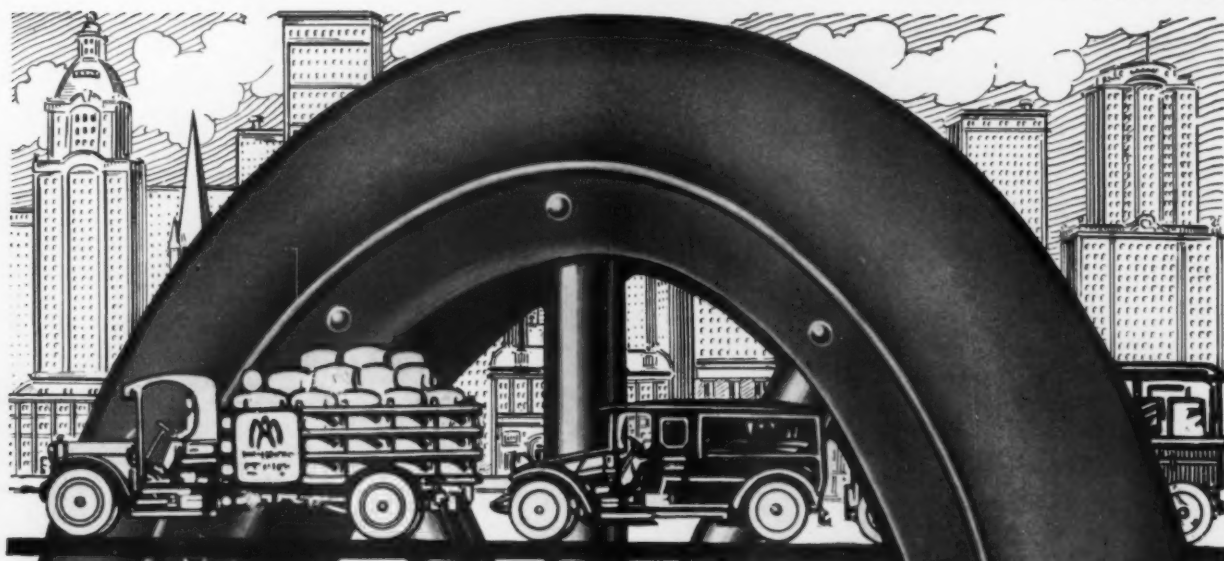
Sales Offices in all Centers and Representatives Everywhere

Original patentees and manufacturers of standard self-measuring hand and power-driven pumps, large and small tanks, gasoline and oil-storage and distributing systems, self-registering pipe-line measures, oil-filtering and circulating systems, dry-cleaners' systems, etc.

ESTABLISHED 1885

When Writing, Please Say—"Saw Your Ad. in the C C J"





A Continuous Procession
of Trucks Equipped with

Phineas Jones & Co. Wheels

can be seen in almost
any large city, any time

The knowledge, experience and ability that comes from 58 continuous years of successful wheel making are concentrated in our product. Because of their past records, their present performances, and their unexcelled quality, truck makers and owners put them on their cars with a feeling of absolute confidence.

PHINEAS JONES & COMPANY
Established 1855

305 Market St., Newark, N. J.
12th Ave. & 55th St., New York, N. Y.
1625 South Los Angeles St., Los Angeles, Cal.

SIXTY-TWO different manufacturers are now specifying LONG cooling systems.

We have been able to furnish them with exactly the system they wanted and needed.

Our modern factory with its efficient crimping, punching, bending and stamping machinery makes our product **uniformly good.**

We make all kinds of cooling systems—cellular, honeycomb, spiral tube types, for all kinds of cars, trucks and tractors.

Also hoods, radiators and accessory fittings.

We guarantee to solve your cooling problems.

Let our Engineering Department help you.

Long Manufacturing Co.
Detroit Michigan



LONG

\$500 Will Put This \$2000 Truck Into Service

The Selden Sales Plan enables every merchant and manufacturer, who needs a truck with a rated capacity of one ton, guaranteed to carry 3000 lbs., to put the Selden at work and let it earn the remaining monthly payments of \$125 each.

Every live business house is an immediate prospect for a Selden deal.

Actual comparison part for part shows that

The Selden Truck

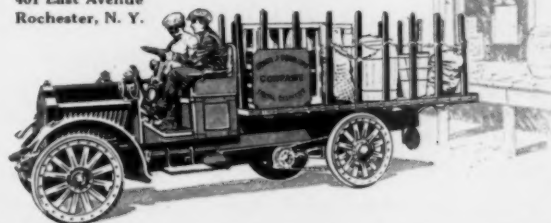
is the strongest truck in its class.

Every Selden sold sells another Selden.

We want dealers who "know how" to sell trucks and who want to sell a truck worthy of their whole-hearted endeavor. Write today giving sales and service facilities.

SELDEN TRUCK SALES CO.

401 East Avenue
Rochester, N. Y.

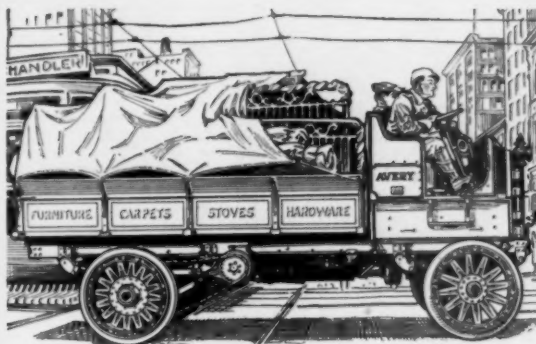


ROSS STEERING and DIFFERENTIAL GEARS

**are standard on good
motor truck
construction**

WRITE FOR CATALOG

ROSS GEAR & TOOL CO.
790 Heath St. :: Lafayette, Ind.



You Can Use an Avery Truck All the Time

One of the biggest features about an Avery Truck is the fact that it can be used all the time, in both dull and rush seasons. By buying a truck to fit your regular season you can get out your deliveries at a minimum amount of expense in both your dull and regular seasons, and at a great saving over horses. Then when your rush season comes, all you have to do is to attach a loaded trailer behind your truck. In this way you do not have to have two trucks but can use your one Avery all the year around.

Because of this feature Avery Trucks are great money savers. With an Avery your deliveries can be made profitable the entire year.

Avery Trucks are made in all sizes from one to five tons capacity for all kinds of work. The Avery truck catalog will give you some splendid information about your hauling difficulties. Address:

THE AVERY COMPANY, 950 Iowa St., Peoria, Ill.

KOEHLER

ONE TON TRUCK \$750.

DEALERS:

Here are just a few of the many good reasons why you should handle the Koehler Truck:

Lowest priced ton truck on the market.

Greatest value of any truck at any price.

Only one chassis — hence small investment.

Most popular size.

Adaptable to all lines.

Simple in construction.

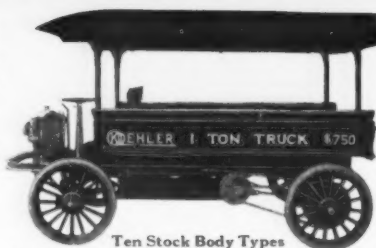
Easy to operate.

Economical in upkeep.

Efficient in service.

A great profit producer.

Write for full information.



Ten Stock Body Types

24 H. P. Motor
"L" Schebler Carburetor
Bosch Magneto

2-inch Axles

36-inch Demountable Tires

90-inch wheelbase

Positive Lubrication

H. J. KOEHLER S. G. COMPANY
1709 BROADWAY, NEW YORK

ROWE MOTOR TRUCKS



are used in every line of business and in every case have proved the most economical means of hauling.

A Rowe Truck will save you money in transporting your merchandise.

The Rowe Truck is guaranteed to give

Continuous Economical Operation

Worm or chain drive. One to five ton capacity

Rowe Motor Manufacturing Co.
Downingtown, Pa.

B. A. Gramm's Motor Trucks

Newest Designs, Latest Improvements; Built in every detail to insure satisfactory and permanent results.

Write for photographs, descriptive literature and the exceptional values we offer you—far beyond all others.

The Gramm-Bernstein Co.

Exclusive Motor Truck Builders

Lima, Ohio, U. S. A.

—ACME— Universal Joints

These are the best universal joints that a truck manufacturer could put in his product. They embody every essential feature necessary to make it the nearest perfect Universal Joint for use in trucks.

ACME JOINTS are remarkable for their simplicity and durability and are best adapted to withstand the severe wear and strain to which they are subjected in motor truck usage.

The ACME can be removed from a car without moving a unit of the power transmission. This feature alone gives it a great advantage over any other joint on the market.

They are so accurately made that they are interchangeable and necessary repairs can be made without difficulty.

Ask us to prove that Acme Joints are better than those you are now using—we'll do it.

The Acme Universal Joint Mfg. Co.
1421 Fulford Street, Kalamazoo, Mich.



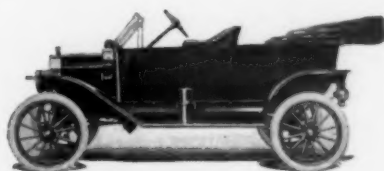
When Writing, Please Say— "Saw your Ad. in the C C J"



Buy It Because
It's a Better Car

Model T \$550
Touring Car
f. o. b. Detroit

Get particulars from Ford Motor Company, Detroit



**THE
Detroit
ELECTRIC**

**COMMERCIAL
VEHICLES**

**ANDERSON ELECTRIC
CAR COMPANY**

DETROIT

MICHIGAN

The
**Motsinger
Carburetor**

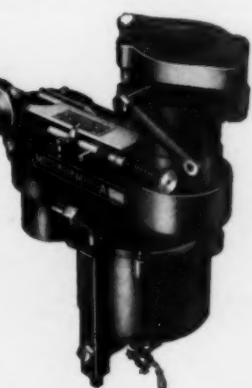


having but one adjustment, is as simple as a carburetor can be made to give satisfactory service and meet the many changes in temperature to which it is subjected.

On a truck, simplicity, efficiency and economy are important.

All three
are found in
**THE
MOTSINGER**

Put
one
on
your
truck



**Motsinger
Device Mfg. Co.**
963 Miami St.
LAFAYETTE
INDIANA
U. S. A.

Motor Truck Bands

MADE WITHIN THE FOLLOWING

Dimensional Tolerances

(ADOPTED BY THE SOCIETY OF AUTOMOBILE ENG.)

1.—Tolerance in circumference of felloe band:

| | Plus | Minus |
|---------------------------------|-------|-------|
| Before application to wheel - - | 1-32" | 1-32" |
| After " " " " - - | 1-16" | 1-32" |

Variation from precise measurement shall be uniform over entire width of band.

2.—Tolerance in width of felloe band:

| | Plus | Minus |
|------------------------------|-------|-------|
| Up to and including 4" - - - | 1-32" | 1-32" |
| 4-1-16" to 6" - - - - | 3-64" | 3-64" |
| 6-1-16" to 12" - - - - | 1-16" | 1-16" |

3.—Variation in trueness of band when placed on surface plate: Band shall touch at all points within 1-32" up to and including 6" width. Over 6" width within 1-16".

4.—Variation in thickness of band: .006" plus or minus.

5.—Trueness to round. The radial tolerance on the wheel when felloe band is applied shall be 1-16" plus or minus. This plus or minus tolerance must not occur at diametrically opposite points. There shall be no flat spots or kinks in felloe band on the finished wheel.

The Standard Welding Company
CLEVELAND

NEW YORK

CHICAGO

DETROIT

USE KEROSENE

CUT YOUR FUEL EXPENSE IN HALF

WITH THE

G. C. VAPORIZER

It runs any motor on kerosene and the cheaper fuels better than on gasoline, and operates without carbon, odor or smoke.

Every truck owner and user should learn all about this extraordinary motor improvement by sending for our booklet,

"Use Kerosene as Fuel"

**G. C. Vaporizer Company
of America, Inc.**

1790 BROADWAY

NEW YORK

COTTA TRANSMISSIONS



Internal View of Shaft-Drive Transmission,
designed for use in worm-drive trucks

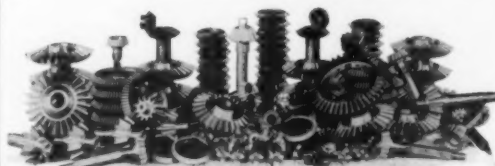
**For Heavy Truck and Tractor Service
Eliminate Transmission Trouble**

Selective type, individual clutch system. All gears always in mesh. Countershaft and mainshaft gears idle on direct. Improved speed-changing device. No plain bearings—loose gears mounted on roller bearings.

Write for Bulletin

COTTA TRANSMISSION CO.
814 So. Main Street Rockford, Illinois

GEARS



GEARS

Bevels
Spurs

Mitres
Spirals
Sprockets

Worms
Racks

GEARS

We produce in quantities to specification cut and planed Gears and Pinions of all descriptions. As a source of supply in connection with *Gears and Gear Cutting*, we are considered an asset by many of the best interests. They buy from us year after year, because these advantages are afforded:

- (1) Unexcelled facilities.
- (2) The highest standard of workmanship.
- (3) Years of experience as specialists in gearing.
- (4) A most careful selection of materials.
- (5) Particular attention to deliveries.

THE VAN DORN & DUTTON CO.

Gear Specialists
CLEVELAND (Sixth City)

GEARS



2000-**PALMER**-3000-
POUND POUND
The Standardized Truck

The service you get from a truck depends on the integrity of its parts. Every part of the Palmer is built by a specialist in a gigantic factory devoted to that part alone. We maintain this integrity when we combine these parts.

PALMERS FOR EVERY PURPOSE

You can use a Palmer in your hauling.
You should use a Palmer if you can.

Palmer 2000-pound—\$1600; 3000-pound (carrying capacity to 2 tons)—\$2000.

DEALERS:—Write For Territory

PALMER-MEYER MOTOR CAR CO.
5027-35 McKissock Avenue, St. Louis, Mo.

A Strong Plug for Heavy Work



You can't expect a brittle Spark Plug to stand the strain and jars of your motor truck. Plugs insulated with porcelain, mica, etc. are bound to break.

HERZ PLUG

"Bougie Mercedes"

is an exquisite combination of STONE and STEEL. It is made to stand up, and it does. Its insulation is

Double Unbreakable Stone

It is Blue Enameled. HERZ PLUG has Four Sparking Points of Platinum-alloy, which ensure a fat, hot spark at all times. It is Self-Cleaning and

Guaranteed a Full Year

HERZ & CO., 245 W. 55th St., New York
Makers of the HERZ MAGNETO

What Sort of Bearing Bronze Do You Use and Why?—

There's only one reason why a wise man selects some particular kind of bearing bronze. And that is, because he figures that this particular kind gives longer, better service than ANY OTHER. He knows that the life and usefulness of a truck depend on bearings, as on few other things.

HIGH SPEED
NON-GRAN
BEARING BRONZE

THE ONLY NON-GRANULAR OR FIBROUS
BEARING BRONZE—WEARS TWICE AS
LONG AS ANY OTHER BRONZE MADE

AMERICAN BRONZE COMPANY
240-280 Chester Boulevard BERWYN, PENNA.



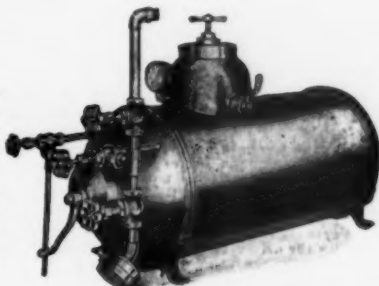
3-Gallon
Approved
Extinguisher

Chemical Fire Apparatus

HAND EXTINGUISHERS and TANKS

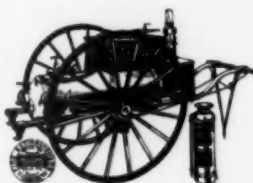
of every description for department apparatus. We are equipped to make tanks of any size or type.

We also provide a complete line of Chemical Engines, mounted on wheels for service in factories, towns, villages, etc. Hose Reels, Hose Axles, Ladders, Hooks, etc.



35-Gallon Copper Tank

We can equip any chassis complete with body, chemical apparatus, etc. **Ask us.**



O. J. CHILDS CO.

48 Liberty Street
UTICA, N. Y.

Hayes Wheels

Our motor truck department is equipped with the latest improved and specially designed machinery, and with an experienced, capable organization, to turn out the best wheels ever made for motor trucks.

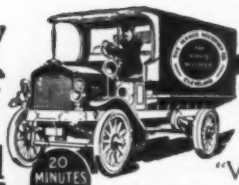
Hayes quality is known from ocean to ocean. **Hayes Wheels** are used, among others, by these leading automobile and truck manufacturers:

| | |
|----------------------|----------------------|
| Studebaker | Standard Motor Truck |
| Detroit Electric | Federal |
| Garford | Speedwell |
| Imperial | Cadillac |
| General Motors Truck | Sandow |
| Brown Commercial Car | Gramm |
| Chalmers | Woods |
| Columbia | Moon |
| Maxwell | Regal |
| Rambler | Packard |
| Overland | Mogul |
| Jackson | Elkhart |

SUBMIT YOUR SPECIFICATIONS
TO US FOR QUOTATIONS

HAYES WHEEL CO. :: Jackson, Mich.

Every
minute
on
record



Whether
you operate motor
trucks or horse
wagons—
"WASTED TIME"

is costing you more money
than you realize.

Eliminate this waste of time and your equipment will
return you a handsome profit—Cost sheets and checking systems
are good as far as they go, but they don't go far enough. The

SERVIS RECORDER

will give you accurate, impartial, mechanical supervision
over your equipment at all times. It will show you clearly
the time a vehicle is in use—the time spent on the road—the
time spent in loading and unloading—It will demonstrate
whether the cost is out of proportion to the work per-
formed—whether you need more or fewer vehicles—which
is best adapted for your needs, motor trucks or horse vehicles.

The Servis Recorder has no gears or outside connections
—it is tamper-proof and works equally well on all vehicles—
It will expose instantly any unlicensed use of a vehicle.
Without cost to you we would like to demonstrate on your
own vehicles how the Servis Recorder will save you money.

The Service Recorder Co.

2432 E. 105th St., Cleveland, O.

Branches in Twenty-Two Cities



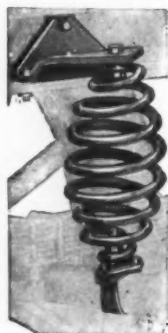
4 MIN
RUNNING
TIME

30 MIN
DELIVERY
STOP

SAGER Shock Absorbers

Absolute Necessity for Commercial Cars

SUCCEED WHERE OTHERS FAIL



Endorsed by:

SAURER
FRANKLIN
ATTERBURY
KISSEL KAR
STEWART
OLDSMOBILE
ELMORE
CRAWFORD
LOGAN
DORRIS
RAMBLER
MAXWELL
STODDARD-DAYTON
POPE-HARTFORD
AUTOCAR
COLUMBIA

Try a set at our expense

We also make bumpers to protect radiator and
other vital parts at front of truck.

J. H. SAGER COMPANY

293 South Ave. - - Rochester, N. Y.

Stewart Delivery Trucks

An Almost Unlimited Field

Not only do we build Stewart Delivery
Trucks right; we build the best capaci-
ty of truck for the most uses. This
is important for dealers to bear in
mind, just as it is a point of consider-
able weight with owners.

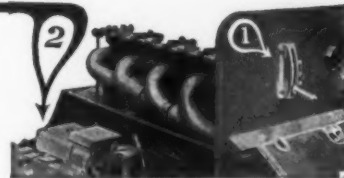
The Stewart is a 1500 pound delivery truck.
Chassis price, \$1500. We build this capacity
truck because it serves an almost unlimited
field—greater than can be reached by any
other truck. We concentrate on one model
because in so doing we are able to give the
greatest possible dollar-for-dollar value.

Write and find out if your territory is open. Also secure
further information about the sensational record of
Stewart trucks in 80 lines of business.

Stewart Motor Corporation, Buffalo, N. Y.

T. R. Lippard, Pres. and Gen'l Mgr. R. G. Stewart, Vice-Pres. and Chf. Eng.
R. P. Lentz, Sec. and Treas.

Make your motor
truck as easy
to handle and as
economical in
upkeep as a pleas-
ure car, by in-
stalling



SIMPLE—STURDY—ACCESSIBLE

Dyneto-Entz
TRADE MARK

Electric Starter and Lighting System

Don't expect your driver to break
his back cranking a big engine.
He would rather let the motor
run from morning till night. You
pay for gasoline—he doesn't.
When your truck stalls on the
road or in traffic, think of the time
it takes the driver to get under
way again.

Give Your Truck Driver
the Dyneto-Entz Starter

The truck manufacturer can make
room on any new car for the
Dyneto-Entz. On an old car a
garageman or mechanic can find
room for the Dyneto-Entz. One
Switch does away with all other
controls. A single unit motor
generator not only starts the en-
gine every time, but keeps the
storage battery charged. The
storage battery can not be over-
charged. The wiring is simple.

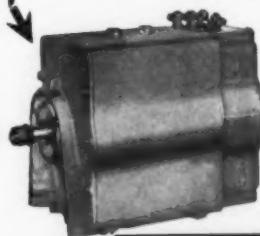
The Dyneto-Entz means that you
never have a Stalled Car. Standard
Equipment on Franklin, White,
Tribune, Stewart, Chase and Other
Cars.

Write for Full Particulars

Dyneto Electric Co.

Dept. M SYRACUSE, N. Y.

Sales Agent: T. J. WETZEL, 17
W. 42nd Street, New York City





International Harvester Motor Trucks

Good business? Of course it's good business to install motor truck delivery. If you are handling horses or trucks; if you own and use horses; if your deliveries require speed or much light hauling, it will pay you to buy and use International Harvester motor trucks—one for a small business and a fleet of them for a large one.

This truck will do the work it is sold to do. Eight years of success back up that statement—eight years devoted to the development of one chassis through experiments with all kinds of street, road and loading conditions in more than one hundred different kinds of business. This record together with the responsibility and standing of the company behind the truck is the best guarantee of satisfaction you could get.

The International Harvester motor truck has a rated capacity of one-half ton, and a 20 H. P. engine furnishes ample power to drive the truck over any road, up any hill. Any desired style of body can be furnished. Bodies can be changed in a few minutes. In economy of running and in low up-keep cost the International Harvester motor truck leaves nothing to be desired. Write for full information about this steady-running, dependable truck. Address the,

International Harvester Company of America
(Incorporated)
182 Harvester Building Chicago U S A

Chilton Advertising Post Cards

in colors should be included
in every advertising campaign

Your prospective customer *may* see your catalog or magazine advertisement, but he is sure to read your **CHILTON POST CARD**.

The use of the post card in colors is the modern way to advertise and economize. It is a *personal-appeal* form of publicity which invariably attracts attention, and is sure to land orders.

Forward us your printed matter, state what you want to advertise and how many cards you can use, and we will do the rest.

CHILTON COMPANY

Market and 49th Streets

PHILADELPHIA, PA.

GOOD YEAR
AKRON, OHIO

Motor Truck Tires

We make, to supply an immense trade, seven types of motor truck tires—a tire for every service.

Under certain conditions you want **block** tires on rear wheels. Note in Goodyear Block Tires, **each block has its own, individual fastening**. Thus you can remove a single block without disturbing a half dozen others—or more.

We make a Solid Demountable Tire which is not only marvelously easy to **remove**, but which **can't creep**. This is accomplished by our **split ring** which automatically adjusts to all irregularities in tire or rims. Has hard metal sub-base, hard rubber base, soft rubber tread. All perfectly unionized. Thus we secure unusual wear at base as well as tread.

The Goodyear Side Flange Quick Detachable is a solid tire for trucks up to two tons. The ever occurring problem of preventing creeping has been completely solved by means of diagonal cross wires in the base. It is never necessary to shellac this tire to the rim.

Our seven Truck Tires are illustrated and completely described in our Motor Truck Tire Catalog.

The Goodyear Tire & Rubber Co.
AKRON, OHIO

Toronto, Canada London, England Mexico City, Mexico
Branches and Agencies in 103 Principal cities.
Write us on Anything You Want in Rubber.

AMERICAN - MADE - FOR - AMERICAN - TRADE

New Departure — GUARANTEED — Ball Bearings

To facilitate supplying demand of garages, dealers and owners for New Departure Ball Bearings, the following distribution agencies are announced, where stock of these bearings is carried:

| | | |
|---|---|--|
| Ahlberg Bearing Co., Pruyn & Blodeau, Ahlberg Bearing Co., Jos. C. Gorey & Co., The Gwilliam Co., Pruyn & Blodeau, Albany Hardware & Iron Co., Syracuse Rubber Co., Iroquois Rubber Co., Rochester Rubber Co., The Gwilliam Co., Bumiller-Remelin Co., Cray Bros., Hearsey-Willis Co., Machinists' Supply Co., Ahlberg Bearing Co., Chicago Pulley & Shafting Co., Herring Motor Supply Co., Faeth Iron Co., Pence Automobile Co., Fred Campbell, Elyea-Austell Co., The Lininger Implement Co., Denver Auto Goods Co., Fry & McGill, M. L. Foss, Bertram Motor Supply Co., J. W. Leavitt & Co., Irvin Silverberg & Co., Kimball-Upton Co., Western Rubber & Supply Co., Western Rubber & Supply Co., Western Rubber & Supply Co., Ballou & Wright, Ballou & Wright, Child, Day & Churchill Co., Automobile Supply Co., | 93 Massachusetts Ave., 1550 River St., Hyde Park, 1790 Broadway, 352 W. 50th St., Broadway & 58th St., 1876 B'way, cor. W. 62d St., 212 S. Clinton St., 279-283 Washington St., 24 Exchange St., 1314 Arch St., 432 Main St., 1111 W. 11th St., 2637 Michigan Ave., 32-36 S. Clinton St., 912-14 Locust St., 1125-31 W. 8th St., 800 Hennepin Ave., 1109 Locust St., Sixth & Pacific Sts., 1600 Broadway, 16th & Broadway, 1729 California St., 251 S. State St., 301 Golden Gate Ave., 541 Van Ness Ave., 606-11 E St., 606-15 Oak Ave., 1011 S. Olive St., 66 S. Fair Oaks Ave., 1364 Fifth St., 7th and Oak Sts., 817 E. Pike St., 1215 First Ave., | Boston, Mass. Boston, Mass. New York City New York City New York City New York City Albany, N. Y. Syracuse, N. Y. Buffalo, N. Y. Rochester, N. Y. Philadelphia, Pa. Cincinnati, Ohio Cleveland, Ohio Indianapolis, Ind. Pittsburgh, Pa. Chicago, Ill. Chicago, Ill. Des Moines, Ia. Kansas City, Mo. Minneapolis, Minn. St. Louis, Mo. Atlanta, Ga. Omaha, Neb. Denver, Col. Denver, Col. Denver, Col. Salt Lake City, Utah San Francisco, Cal. San Francisco, Cal. Sacramento, Cal. Los Angeles, Cal. Pasadena, Cal. San Diego, Cal. Portland, Ore. Seattle, Wash. Spokane, Wash. Tacoma, Wash. |
|---|---|--|

New Departure Mfg. Co., Bristol, Conn.

When Writing, Please Say—"Saw Your Ad. in the C C J"

**"Reliable Springs are
More important on
Commercial Cars than
on Pleasure Cars."**



THE PERFECTION SPRING CO.

Cleveland - - - - - Ohio



**THE PROVEN
TRANSMISSION**

**14 Years
of
Satisfaction**



Years of unequalled service to users of Covert Transmissions has proven the superiority of Covert construction.

Designed right—built right—by men who know.

Made in sizes suitable for commercial vehicles from 500 lbs. to 10,000 lbs. capacity.

Covert Motor Vehicle Co.

SALES OFFICE
Detroit, Mich.

FACTORY
Lockport, N. Y.

Worcester Presteel

Rear Axle
Housings
Ball Cups
Segments
Shims
Hub Caps
Hub Flanges



Brake Drums
Brake Guides
Quadrants
Wrenches
Covers
Joint Cases

For Commercial Cars and Automobiles

We specialize in cold hollow drawing, pressing, forming, coining, punching and stamping parts for motorcycles, bicycles, cream separators, textile and electrical machinery, and for other purposes, to order.

In steel, brass, copper, aluminum, monel metal and other sheet metal alloys.

Worcester Pressed Steel Company

Main Office and Factory

Worcester : Massachusetts

San Francisco Office, 333 Rialto Building
Portland, Oregon Office, 520 Sweetland Building
Chicago Office, 1243 Peoples Gas Building
Detroit Office, 1417 Ford Building
Philadelphia Office, 418 Land Title Building
New York Office, 154 Nassau Street



The Apple Electric Company

86 Canal Street

Dayton, Ohio

America's Leading Manufacturer of

Electrical Equipment

For

**Motor Trucks, Motor Boats and
Motor Cars**

Electric Engine Starters

Electric Engine Starters

Electric Lighting Outfits

Electric Lighting Outfits

(For Motor Trucks)

(For Motor Boats)

The Famous Apelco Storage Batteries

Electric House-Lighting Plants

Write For Bulletins

The Apple Electric Company

86 Canal Street

Dayton, Ohio



This is the "Jasco Tank"

¶ It is made absolutely seamless and leakless, of drawn steel, thoroughly tinned and tested. It is

THE SAFETY GASOLENE RECEPTACLE FOR THE AUTO

¶ It not only insures the safety of the car and its occupants, but stops the constant drain on pocketbooks caused by waste of gasoline. Made in all standard styles and sizes.

JANNEY, STEINMETZ & COMPANY

MAIN OFFICE: PHILADELPHIA, PA.
NEW YORK OFFICE: HUDSON TERMINAL BLDG.



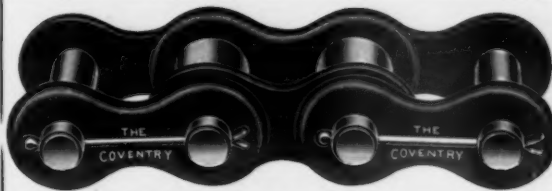
World's Largest Manufacturers of Ignition

THE best authorities agree that your truck investment will not be profitable unless the service is continuous. The one and only way to guarantee continuous service is to guarantee 100% efficient ignition with the famous Remy Magneto.

Remy Electric Company

Anderson, Indiana

Service Stations Throughout the Country



"The Coventry" Detachable Roller Chain

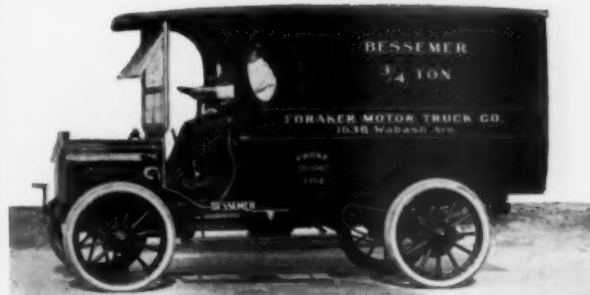
Note the large heavy-duty cotter-pin connecting the two rivets. The mechanical superiority of this method of coupling can easily be appreciated. Vibrations and jars cannot weaken the double-size coupling as is the case where two smaller cotter-pins, one for each rivet are employed.

Combine the established reputation of "The Coventry" Chains for precision, perfect retention of pitch and unparalleled durability with this final touch of perfection and you will understand why "The Coventry" Chains are consistently specified by those desiring the maximum of transmission efficiency.

Our catalog comprehensively covers "The Coventry" line, and will be sent immediately upon request.

Herbert F. L. Funke Co., Inc.

Dept. V 116 Broad Street New York



BESSEMER TRUCK

Illustration shows Model "C" which is equipped with either pneumatic or solid tires. There is more real sturdiness built into this than in any other one-ton truck on the market.

Three Models

| MODEL C | MODEL A | MODEL D |
|-----------------|-------------------------|-------------------------------|
| 1 Ton Capacity | 1 1/2 to 2 Ton Capacity | 1 1/2 to 2 Ton Capacity |
| 25 H. P.—\$1250 | 30 H. P.—\$1800 | Worm Drive 30 H. P.—\$2300 |

DEALERS: Write us about the special proposition we have for you. The Bessemer line enables you to handle every truck requirement.

BESSEMER MOTOR TRUCK CO.
GROVE CITY, PA.

A Popular Size—A Popular Price— And A Krebs



MODEL E—HALF-TON—
KREBS, \$1,100

Krebs quality, reliability and low maintenance costs are features with which every prospective purchaser of a motor truck should be familiar. Write us today for full information about this popular model.

Model E, $\frac{1}{2}$ Ton Krebs

Loading Platform 44 in. x 68 in. back of seat.

Price of chassis, \$1,000.

Price with body shown, \$1,100.

Same body including screens, \$1,150.

Without top, \$1,050.

With closed panel body, \$1,200.

We can place a few more dealers in good territory.

THE KREBS COMMERCIAL CAR CO., CLYDE, OHIO



CULLMAN SPROCKETS and Differentials

in stock and to
order.

Send for catalog
and let us quote
you on your re-
quirements.



CULLMAN WHEEL COMPANY, CHICAGO
1351 GREENWOOD TERRACE



Pyrene
TRADE MARK
FIRE
EXTINGUISHER

SAVES 15%

**In Your
Fire Insurance Premiums**

Now Is the Time to Equip YOUR Car

The Pyrene Extinguisher is convenient in size, has the maximum of efficiency, is easily operated, presents a handsome appearance, and Pyrene brass and nickel-plated extinguishers are the only types that qualify to pay part of your insurance.

Once knowing the value and true economy of the Pyrene Extinguisher, every careful motorist will make it a standard part of his car's equipment—because Pyrene protects his life, as well as his investment—provides safety for his garage, and obtains for him a substantial insurance reduction.

For reduction in fire insurance rate, consult agents of The Aetna Accident and Liability Co., and the Automobile Insurance Co. of Hartford, Conn.,—or ask your own broker.

Write for booklet—proving the economy, efficiency and supremacy of Pyrene—Send postal to-day to nearest branch office.

Brass and Nickel-Plated Pyrene Fire Extinguishers are the only one-quart fire extinguishers included in the lists of approved Fire Appliances issued by the National Board of Fire Underwriters.

Pyrene Manufacturing Co., 1358 Broadway, New York

| | | | |
|------------|--------------|---------------|----------------|
| Alton | Cincinnati | Louisville | Philadelphia |
| Atlanta | Cleveland | Memphis | Pittsburgh |
| Baltimore | Dayton | Milwaukee | Richmond |
| Bridgeport | Denver | New Orleans | St. Louis |
| Boston | Detroit | Norfolk | St. Paul |
| Buffalo | Duluth | Oklahoma City | Salt Lake City |
| Chicago | Jacksonville | Phoenix | San Antonio |
| | | | York, Neb. |

Pacific Coast Distributors: Gorham Fire Apparatus Co., Seattle

Distributors for Great Britain and the Continent:
The Pyrene Co., 29A Charing Cross Road, London, W. C.



Know Exactly What Each Truck Is Costing You

NO mere mileage report is any guarantee that a truck is being handled efficiently since enormous waste of time can be concealed by over-driving—at a correspondingly increased cost for fuel and maintenance.

To arrive at safe conclusions you must know also the number of stops, the duration of each and the speed at all times. This invaluable record is supplied automatically by the

Jones Recorder

Every movement of the truck and every stop is recorded with minute to minute accuracy on a chart. The record is made in a locked case. It cannot be tampered with in any way. It affords an unbiased report of the care and trustworthiness of each individual driver and enables you to determine running costs with absolute accuracy.

Two Styles

Recorder alone in heavy brass case, price, \$65.

Same with 30-mile Speedometer and Odometer with 100,000-mile season mileage and 100-mile trip mileage, instantaneous trip reset, price, \$85.

H. W. JOHNS-MANVILLE CO.

Manufacturers of Brake Lining, Spark Plugs, Electric Lamps, Recorders, Carburetors, Vaporizers, Electric Horns, Fire Extinguishers, Dry Batteries, Fuses, Tapes, Packings, etc.

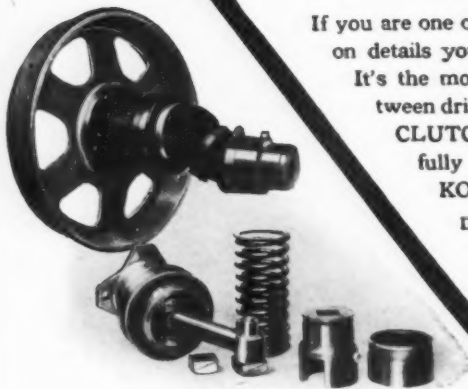
| | | |
|------------|---------------|----------------|
| Akron | Detroit | Omaha |
| Albany | Duluth | Philadelphia |
| Atlanta | Galveston | Pittsburgh |
| Baltimore | Houghton | Portland, Ore. |
| Birmingham | Houston | Rochester |
| Boston | Indianapolis | St. Louis |
| Buffalo | Kansas City | St. Paul |
| Charlotte | Los Angeles | Salt Lake City |
| Chicago | Louisville | San Francisco |
| Cincinnati | Memphis | Seattle |
| Cleveland | Milwaukee | Syracuse |
| Columbus | Minneapolis | Toledo |
| Dallas | Newark, N. J. | Washington |
| Dayton | New Orleans | Wilkes-Barre |
| | New York | Youngstown |



2292

KONIGSLOW CLEVELAND

can solve your clutch problem



If you are one of those concerns who are rather keen on details you know that the CLUTCH talks. It's the most frequent point of contact between driver and car. KONIGSLOW'S CLUTCHES will speak as forcefully for you as they do for KONIGSLOW

Don't wait till you are ready to place orders—write today to

**KONIGSLOW
CLEVELAND**

For
**Clutches
Clutch Rocker
Shafts
Control Levers
Universal Joints**

The Otto Konigslow Mfg. Co.,

Detroit Office
J. H. GOULD
1202 Majestic Bldg.

Cleveland



LAVIGNE Steering Gears

Equip your product with dependable Steering Gears. Get the best—Lavigne

THESE are the standard for Commercial Cars, Trucks, Tractors and High-Grade Pleasure Cars. Their quality is so high and their service records so good that we make more steering gears for Commercial Cars than any other manufacturer.

They are made in every size to meet every requirement and are furnished with drag links.

We specialize in heavy gears for motor fire apparatus.

Our prices are right and we make prompt shipments.

WRITE FOR BLUE PRINTS

THE LAVIGNE GEAR CO.
Station A RACINE, WIS.

HESS-BRIGHT

Ball Bearings



For accuracy— choose H. B. Ball Bearings
 For maximum of strength— choose H. B. Ball Bearings
 For precision of manufacture— choose H. B. Ball Bearings
 For remarkable durability— choose H. B. Ball Bearings
 For all-round serviceability— choose H. B. Ball Bearings
 For the utmost satisfaction— choose H. B. Ball Bearings
 and you will never have occasion to regret your choice, for
 Hess-Brights excel in each and all these points.

THE HESS-BRIGHT MANUFACTURING CO

Main Office and Plant No. 2 on New York Division of Penna.
 R. R., Front Street and Erie Avenue, Philadelphia, Pa.

Stores for Retail Distribution:

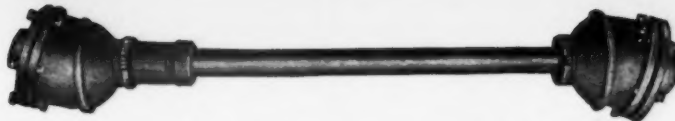
Philadelphia
 666 N. Broad Street

New York
 1974 Broadway

Chicago
 1800 Michigan Avenue

Spicer

Universal Joints



UNIVERSALLY ACCEPTED AS THE MOST DEPENDABLE FLEXIBLE CONNECTION
 KNOWN TO MOTOR CAR PRACTICE

OIL-TIGHT

DUST-PROOF

PARTS INTERCHANGEABLE

SPICER MANUFACTURING COMPANY, PLAINFIELD, N. J.

Sales Representatives:

K. Franklin Peterson, 122 S. Michigan Blvd., Chicago; L. D. Bolton, 2215 Dime Savings Bank Bldg., Detroit; Thomas J. Wetsel, 17 W. 42d St., New York
 Foreign: Benjamin Whittaker, 21 State Street, New York

When Writing, Please Say—"Saw Your Ad. in the C C J"

There Is Good Territory Open
for the Sale of

CROCE MOTOR TRUCKS



3/4, 1, 2 and 3 Ton Trucks

Dealers who are desirous of handling a high-class truck of proved ability that justifies strong arguments, gives complete satisfaction and builds up a business, are invited to investigate the CROCE. It will be found to excel in these very essential factors—quality, economy, efficiency, durability and value.

Consider these points for a moment:

QUALITY—that is proved by the parts used, such as Timken Axles, Wisconsin Motors, Spicer Universal Joints, Schwarz Wheels, Kells Radiator, Bosch Magneto, Brown-Lipe Transmission, Schebler Carburetor, and other equally high-class parts.

ECONOMY—The CROCE distinctive design causes the weight to be one-fourth less than other trucks of similar capacity. This saves enormously on tires and gasoline and makes operation very economical.

EFFICIENCY—In every line of business in which it has been used it has made good. The best proof of this is the fact that we get repeat orders from nearly every customer.

DURABILITY—The CROCE is built so well that it gives long-continued and satisfactory service. The first CROCE built is still in active service after years of usage. The construction is such that every buyer has the right to expect a similar record.

VALUE—There is full value for every dollar in CROCE trucks, and in the long run they are much cheaper than those whose first cost is less.

If these qualities appeal to you as being what you and your trade want, write us for complete descriptions, territory, terms, etc.

CROCE AUTOMOBILE CO.
ASBURY PARK, N. J.

Dependable Truck Frames of Pressed Steel

We were the *pioneers* in the manufacture of Pressed Steel Frames and are today the *largest makers*.

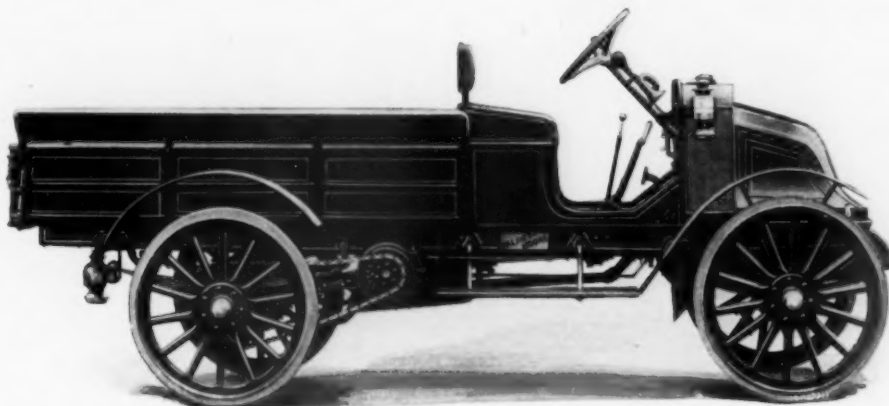
Because of our knowledge, skill, experience and facilities for frame production, our product enjoys an enviable reputation for quality, durability and all 'round supremacy.

Responsible truck makers desiring the best frames obtainable are invited to communicate with us regarding their 1914 requirements.

A. O. Smith Co.
Milwaukee



***Air-Cooled and Water-Cooled
1600 lbs. capacity ∴ All styles of bodies***



Open Express (water-cooled) with sliding-gear transmission. Price, \$1,425
With planetary transmission. Price, \$1,375

Palmer-Moore Water-Cooled Motor

To satisfy the demand of those who insist on a water-cooling system, we offer the Palmer-Moore water-cooled motor. This motor is the same type, size and construction, and has the same patented variable port features that characterize our valveless air-cooled motor. In fact, it has all the great merits of *flexibility, simplicity and economy* which distinguish our air-cooled motor.

One of the several unique features of the Palmer-Moore water-cooled motor construction which will attract immediate attention is the radiator which has 30 per cent greater radiating capacity than is usual for a motor of this size. This in itself is important in that it allows a big margin of safety. The radiator is of the dashboard type and is located back of the motor, thereby reducing to a minimum the chances of injury from collisions.

We are looking for aggressive dealers everywhere—the kind that know a dependable truck when they see it, and who appreciate *good will and service* on the part of the manufacturer.

Let us hear from you

PALMER-MOORE COMPANY
SYRACUSE, N. Y.

POLACK

TYRES

INSURE TRUCK SERVICE

Ask Polack Users

**33,000
Miles Even
Stretches
the Polack
Guarantee**

ALEXANDER CAMPBELL, President

CAPITAL \$ 500,000.00

A. CARLYLE CAMPBELL, Secretary and Treasurer

MAIN OFFICE
802 FULTON ST.
BRONX OFFICES
815 PLATTENBURG AVE.
BRONX, N.Y.
SHERMAN ST.
RICHMOND HILL, L.I.
75 HAWK ST.
MERRITTON, L.I.
WEST 42ND ST. & 10TH AVE.
CORNY, N.J.
14 WILLIAMS AVE.
EAST NEW YORK
718 NEWARK ROAD
BUCKVILLE, CENTRAL, L.I.



CREAMERIES:
OYSTERS POINT, N.Y.
GULF SHORE, N.Y.
MORRIS, N.Y.
LAKESIDE, N.Y.
NEW BRIDGE, N.Y.
SALEM, N.Y.
SCHUYLER, LAKESIDE, N.Y.
HACKETTSTOWN, N.J.
BUCKVILLE, N.J.
PURITY FARM, N.J.
LANE, ARIZ., PA.

802 FULTON ST., BROOKLYN, N.Y., Jan. 2nd, 1914.

Polack Tyre and Rubber Co.,

246 W. 59th Street,
New York City

Dear Sirs:

We have much pleasure in replying to your letter of the 10th ult., and stating the number of miles service we have received from the following tires supplied by you as under.

| No of Tires. | Period of Service. | Length of Service in months. | Miles of Service. |
|----------------------------------|---------------------------------------|------------------------------|-------------------|
| 244 | Oct. 20th 1911 to Aug. 9th 1913 | 22 | 33,000 |
| 1904 | Feb. 15th 1912 to Aug. 9th 1913 | 18 | 18,900 |
| 1665) 1690) 1684) 1670) | Feb. 5th 1912 to Nov. 18th 1913 | 21 | 22,050 |

Yours very truly,

Alex. Campbell Milk Co.

Per *Erik Lagerquist*
Superintendent.

Satisfactory truck service depends on satisfactory tyre service. Far-sighted Truck Manufacturers therefore fit **POLACK** Tyres as an absolute insurance of service to their Customers.

Our guarantee of 10,000 miles is invariably exceeded. Each mile more resilient at less cost per mile.

POLACK TYRE & RUBBER CO.

NEW YORK

Factory, Bridgeport, Conn.
Boston, 146 Summer Street

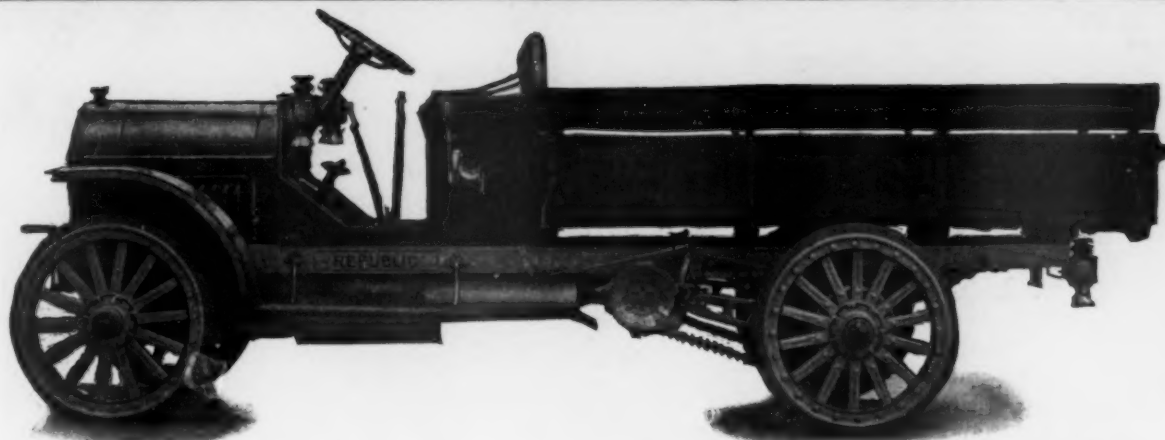
Philadelphia, 1803 Market Street
Chicago, 1344 Michigan Avenue

Detroit, Goldberg Building
St. Louis, 1830 Locust Street

Pittsburgh, First Ave. and West St.
Washington and Baltimore

When Writing, Please Say—"Saw your Ad. in the C C J"

REPUBLIC MEANS SERVICE



\$1425—Republic 2000 lb. Truck, Fitted With Standard Express Body—**\$1425**

DEALERS—This Service is the Kind Your Prospects Have Been Waiting for

Many large concerns have hesitated to install motor haulage on account of their inability to find a truck that would give them dependable day in and day out service.

All over the country Republic Trucks are proving to satisfied owners the fact that their use always results in economy both in time and expense to the user.

This splendid service given by Republic Trucks is in a great measure due to the fact that every part that enters into their construction is absolutely "standard." That is—each unit is made by a specialist in that line—with the standing and prestige of the maker behind it.

Buyers in all lines of business are appreciating the fact that the use of these "standard" parts means added life—less upkeep cost—fewer delays and more dependable service.

Dealers find that they can make sales easier if their trucks are made of these "standard" units. Every part of a Republic Truck, in addition to being standard, is made with an extra factor of safety—in fact, many of the parts are used on some of the leading 1½ and 2 ton trucks.

Dealers will find that they can make a very profitable arrangement for selling Republic Trucks in their territory.

Write or wire today for complete information about our selling plan

Continental Motor
Schebler Carburetor
Eisemann Magneto
Russel Jack Shaft

SPECIFICATIONS:
Hyatt Roller Bearings
Hartford Joints and Clutch
Culver-Taylor Chains

Covert Transmission
Lewis Springs
Left-Hand Drive
Center Control

Capacity, 2000 lbs.

Body, Stake or Express

Price, \$1425

ALMA MOTOR TRUCK CO.

Factory, Alma, Mich. General Sales Office, 870 Woodward Ave., Detroit, Mich.

Export Office, 17 Battery Place, New York

SERVICE STATIONS: 5129 Evanston Ave., Chicago, Ill.; Pico & Hill Sts., Los Angeles, Cal.; 571-77 S. Clinton St., Syracuse, N. Y.; Mignonette & Beatty Sts., Pittsburgh, Pa.; 215 W. 4th St., Columbus, Ohio.



When Writing, Please Say—"Saw Your Ad. in the C C J"

Michigan Steel Casting Co.

FOR CASTINGS OF GREATEST STRENGTH
AND SMOOTHEST FINISH



Detroit, Michigan



SUPERIORITY IN CLUTCHES

THREE-PLATE CLUTCH

DRY DISC

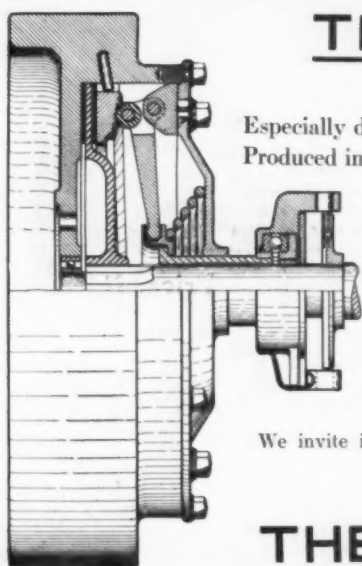


Illustration of Clutch and
Flywheel Combined

Especially designed for truck and tractor service.

Produced in any diameter or power to meet your requirements.

The Borg & Beck Clutch absolutely will not "grab," "stutter" nor "slip."

It is "fool-proof," having a gradual and positive engagement. It eliminates gear-shifting in crowded traffic, by means of friction-slippage, at will, and is the only clutch that can be slipped indefinitely without injury.

Instantaneous and Convenient Adjustment

Built with light friction-disc—no "drag" in releasing.

The Borg & Beck Clutch is the first and final solution of the clutch problem; and its superior points of merit are readily seen by designers and engineers "who know."

We invite inquiries from responsible truck and tractor makers. (From automobile makers, also.)

Ask for Blue Prints

THE BORG & BECK CO.
MOLINE, ILL.



When Writing, Please Say—"Saw Your Ad. in the C C J"

Worm and Wheel Story

England, the home of worm drive, gives the best evidence of its value for trucks. At the last Commercial Car Show, held in July, in London, the following list tells its own story:

(EMBRACING ALL THE BIG MAKERS)

| | | | | |
|----------------------------|---|---|---|-----------|
| Worm-driven models | - | - | - | 21 |
| Chain-driven models | - | - | - | 12 |
| Bevel-driven models | - | - | - | 6 |

Being familiar with its great power and efficiency, the English makers have adopted it.

The man who has made the worm drive a success in England is now with us.

Give us the horse power of your car, approximate speed of the driving shaft, ratio required and the approximate weight of the machine, and let us send you a blue print of what we would recommend.

Why experiment with experimenters?

The Cleveland Worm and Gear Co.

988-992 East 67th Street

CLEVELAND, OHIO

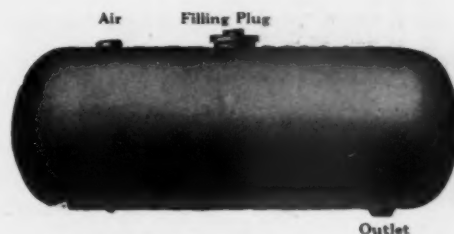
Seamless Steel Tanks

Guaranteed against leakage for two years and
practically indestructible

Truck Manufacturers:

How can you afford to use on your trucks, with the hard service they get, anything but Federal Pressed Steel, **seamless guaranteed** tanks?

Think of the leakage possibility of a riveted tank in comparison. Think what your tank replacements cost last year. Think what an added sales argument for your product a guaranteed, seamless Federal tank will be. Then write us for quotations on your requirements.



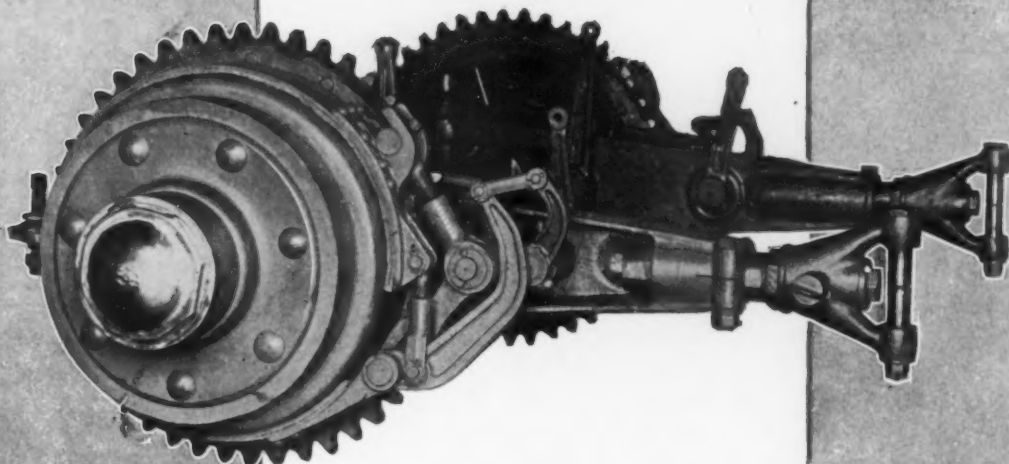
WE ALSO PRODUCE

HEAVY FLANGES AND BRAKE DRUMS

of Any Diameter, Gauge or Height

Federal Pressed Steel Company

Milwaukee, Wis.



The BRAKES BELONG *on the* WHEELS-NOT *on the* JACK-SHAFT

Sheldon Double-Brakes-On-The-Rear-Wheels

Has sounded the death-knell of the jackshaft method of braking. It spells finality as to the location of the brakes because it puts them in the only logically correct position—ON THE WHEELS.

SHELDON EQUIPMENT gives you two sets of brakes on the rear wheels. There is always certainty, as to the braking efficiency—which is not true of jackshaft brakes. Suppose with your present method, the chains should "jump off" at the critical moment? Could you depend on your single set of rear wheel brakes skidding the wheels?

Take our 3-ton equipment as an efficient example. The outside brake is of the wrap-up type acting on the 18-in. by 3-in. pressed steel drum. The inside brake is of the self-intensifying type. Either brake will skid the wheels. You can take your choice of foot or hand brake. There is a braking surface of 500 square inches. To stop a 3-ton truck with 50 per cent overload means applying only 200 pounds pressure per square inch to the braking surfaces. On many trucks the pressure runs as high as 700 pounds per square inch. The self-intensifying feature of Sheldon Brakes gives a uniform pressure on the whole surface of the drum. This is not the case with any other type of brake.

Can you wonder that ordinary brakes fail to hold at the critical moment?

IN A YEAR OR TWO EVERY HIGH-GRADE TRUCK WILL BE EQUIPPED WITH BRAKES ON THE REAR WHEELS. JACKSHAFT BRAKES ARE ALREADY DOOMED! THE LEADING TRUCKS ARE COMING TO DOUBLE-BRAKE REAR WHEEL EQUIPMENT.

Why not make your truck one of the leaders? It'll be a selling point in your favor.

Write us for information on this subject—today.

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

Chicago Office:
68 E. 12th St.

San Francisco Office:
444 Market Street

Detroit Office:
1215 Woodward Avenue



Electric Delivery Saves Time and Money

EVERYWHERE in every line of trade—Electric Delivery Wagons. For bakers, dairies, coffee and spice merchants, confectioners, florists, department stores, laundries, meat dealers, milliners, jewelers—to mention only a few.

Zampieri Brothers, French Bakers, New York City, commenced the use of Electric Vehicles in 1911 with a 750 lb. Electric Wagon. As a result of the striking economy effected, this concern was made horseless in 14 months.

Mandel Brothers of Chicago, recently added ten 1000-lb. Electric Delivery Wagons to their system. The cost of operation per day, is: operating expense per vehicle, \$2—including charging, washing, garaging and replacing of parts; fixed charges, \$1.30—including depreciation, interest, etc.; drivers' wages, \$2.50 per day. The total cost of daily operation, \$5.80.

Send for This Book Today "The Story of the Electric Truck"

The facts and figures that you want to know about the Electric Truck are contained in this beautifully printed book of 36 pages—yours on request. Cost of operation, etc.—actual photographs of newest model Electric Trucks. Send for it today. Kindly ask for Booklet N.

Electric Vehicle Association of America

124 West 42nd Street
New York

Boston

Chicago

95



FELT WASHERS

and all other felts for motor truck trade
made to order promptly at guaranteed prices.

We carry the largest stock of felts and have the finest mechanical equipment in the United States for this particular work.

Dependable goods only, accuracy in manufacture, prompt service are the watchwords of this business.

"If it's made of felt, ask Booth"

N. E. BOOTH, 642-644 Pacific Street, Brooklyn, N. Y.

Republic Mileage

To get mileage you must have quality tires and that is the only kind we make. Of course they cost a little more. That is because they contain the best materials and are the product of the highest skilled workmanship.

One Republic Tire Sells Another

and the man who uses Republics will take pleasure in telling you why. The Republic Staggard Tread is the original non-skid tire just as it is the most effective. Look at the Staggard's patent dates—Sept. 15-22, 1908.

The Republic Rubber Company
YOUNGSTOWN *Branches and agencies in all the principal cities.* OHIO



BUCKEYE Motor Truck Jacks

Buckeye Motor Truck Jacks are safe, reliable and made to stand the wear and tear for which they are intended. They are fully guaranteed, and cannot possibly drop with a load. They are made from Steel Drop Forgings, best finish and workmanship throughout.

Get our prices before you place your orders for jacks, we can save you money.

| No. | Height Bar Down | Raise of Bar | Height Bar Up | Weight | Capacity | with formed handle | List Price |
|-----|-----------------------|--------------------|---------------------|----------|------------|-----------------------|---------------|
| 7 | 11 1/4" | 6 1/4" | 18" | 16 lbs. | 2 1/2 tons | | \$10.00 |
| 13 | 14 1/4" | 7 1/4" | 20 1/2" | 26 1/2 " | 3 " | | 15.00 |
| 14 | 14 1/4" | 7 1/4" | 20 1/2" | 33 " | 5 " | | 16.00 |
| 9 | 11 1/2" | 6" | 17 1/2" | 10 " | 1 1/2 " | | 6.00 |

Write today for descriptive catalog. Made only by

THE BUCKEYE JACK MFG. CO., Alliance, Ohio



FOAMERS

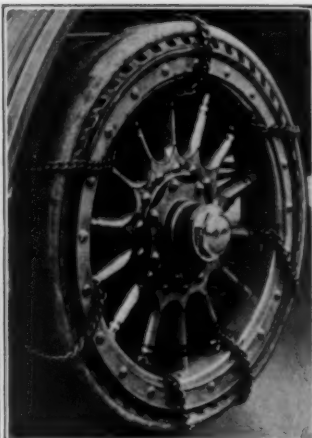
THE PARISH & BINGHAM CO.
CLEVELAND, OHIO

FRAMES

WE HAVE
MADE DURING
JULY, 1912
TO
JULY, 1913
340,890
FRAMES
OF ALL SIZES
FOR 105
CUSTOMERS

When Writing, Please Say—"Saw Your Ad. in the C C J"

"BRO-GOR" ANTI-SKID CHAINS FOR MOTOR TRUCKS



A very practical, efficient, economical device for the insuring of proper traction and the elimination of skidding.

The Device consists of three parts only. A Clamp, attached to spoke, and left there permanently. A Cross Section of steel Chain, toughened by special process, adapted for the hardest use, twisted to present a flat surface to the tire; a connection or repair link, open at both ends, which connects chain with clamp. There are but six or seven cross sections to a wheel, placed on alternate spokes, as experience and tests prove these are as efficient as a larger number and much easier on the tire.

"BRO-GOR" Chains are easier to attach or take off than any others, are more effective, have greater durability and give more satisfaction. Used in the Government Service.

Good territory open. Write for our proposition

The Brockett-Gorham Co.
MARION, OHIO

Which Truck Is Best of the Famous Big Four?

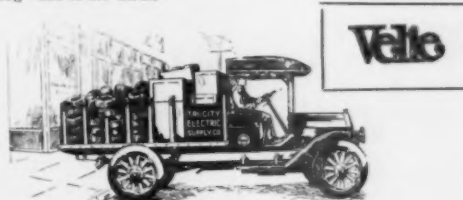
Experienced buyers of motor trucks now choose between four great makes. Each of the four is backed by millions. All are in the business to stay. Among them competition is keen. Almost daily, keenly competitive tests between these four great makes of trucks are establishing which is the best. For all are in use by the largest corporations—who use trucks by the dozen.

In pulling power the Velie Truck, the only one of the big four unadvertised until now, proves that a more powerful, slower running motor will in competitive tests out-pull and out-wear all high-speed, small-powered motors.

In three-ton trucks all four makes have 5 or 6 inch frames—channel shaped, or I-beam. But the Velie in addition to having a 6-inch I-beam frame has a 4-inch sub-frame. And in heavy hauling this extra sub-frame proves its wonderful worth.

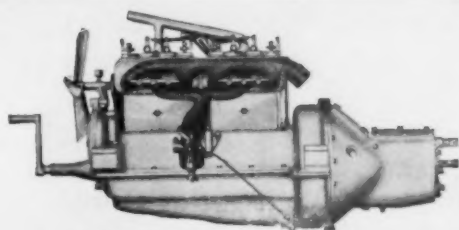
Experienced buyers can tell by comparison of specifications why it is that the Velie is winning the fiercely competitive tests between the four best makes of trucks.

Any Velie agent has these truck contest results on file—they are convincing—ask to see them.



Velie Motor Vehicle Company - Moline, Ill.

KERMATH



MODEL T

UNIT POWER PLANTS

KERMATH AUTOMOBILE MOTORS and Unit Power Plants embody nothing but the best and most conservative design known to the automobile trade today. There is nothing new, freakish or radical about any part of the engine, clutch or transmission. We have endeavored to produce a power plant along standard lines by making same one size, one type only. By devoting our entire efforts to this one type in the refinements of all its details, we are able to give the manufacturer as good a power plant as can be produced on a given size and type, and to do so at a reasonable price. Write for circular and complete specifications.

Kermath Manufacturing Co.
Detroit, Michigan



PLAIN COMPRESSION
(Patented)

Empress

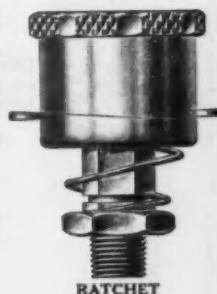
BRASS AND STEEL
**GREASE
AND
OIL CUPS**

WE MANUFACTURE
a full line of Plain, Leather
Packed, Ratchet, Marine,
Spring Compression, and
many other styles of Grease
Cups.

Our line of Oil Cups is
equally satisfactory and
complete.

Catalogue on Application

Bowen Manufacturing Co.
AUBURN, N. Y.

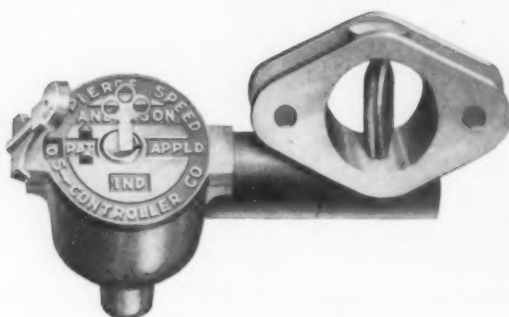


RATCHET

PIERCE

Speed Controllers

Operated From Front Wheel or Transmission



Successfully used by the leading truck and automobile makers.

Leaves motor free under any and all conditions, assures increased efficiency and durability for every part of the car.

The buyer should demand this equipment because it means economy of operation, freedom from abuse, elimination of the temptation to overspeed, removal of fully 50% of the liability of accidents.

In use with the Jeffery, Kissel, White, Hupp, Dart, American Exp. Co., Buffalo Enquirer, Chicago Fire Insurance Patrols and others.

Absolute protection for your car.

Send for prices, blue prints, etc.

The Pierce Speed Controller Company

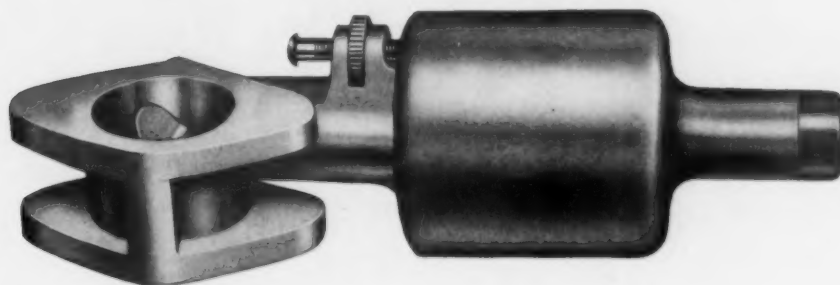
Anderson, Indiana, U. S. A.

Originators of Speed-Controlling Devices for Gasoline-Driven Cars

PIERCE

Universal Motor Governor

Operated From the Engine Direct



Attached to Any exposed rotating part
of Any motor.

Adjustable to Any desired number of
revolutions per minute.

Suitable for Trucks, Automobiles, Stationary Motors,
Tractors, Pumping Machinery, Mining Machinery, Ice
Machinery, etc.

In use by Velie, Davis, Indiana, Lambert, Wisconsin,
Rutenber and others.

Demand this governor on your motor.

The Pierce Speed Controller Company

Anderson, Indiana, U. S. A.

Originators of Speed-Controlling Devices for Gasoline-Driven Cars



Let Me Call On YOU!

A Special Opportunity
to Handle a Better Line
of Trucks

Truck selling will be more and more a **show-down** competition—and there is where the Sternberg truck gives you the best of dealers selling just average trucks—that is why **the Sternberg is the third most used truck in Greater New York.**

I WANT TO CALL ON YOU DURING FEBRUARY. I will visit nearly every city—and I want to give you first-hand facts about Sternberg construction—records—and sales methods. No obligation to you in the least—drop me a line and tell me I am welcome to “show” you

The Sternberg Trucks 2, 2½, 3, 4, 5, 6, 7 Ton Capacities

Sternberg trucks are in use in every line of industry. They have stronger construction, greater abilities and lower up-keep than average trucks—and they give the dealer unusual sales advantages.

If you have the slightest idea of handling a new truck, now, or in the future, drop me a line.

Victor L. Brown.

STERNBERG MFG. COMPANY
Milwaukee (West Allis), Wis.

New 2½ Ton Worm Drive

Here is a model which gives the dealer a tremendous advantage in competition with trucks of this capacity.

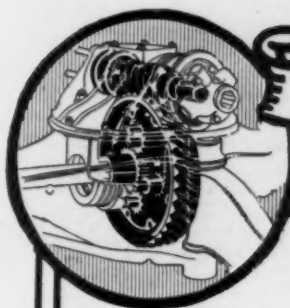
Less unsprung weight than any other truck; better utilization of power, perfect lubrication, strong construction, door on the driver's cab, left-hand drive, center control, long-stroke motor—a different, distinctly new achievement in truck design.

The Sternberg line meets every haulage and delivery need. Supplies the right capacity and body for every service.

How about heavy-duty trucks? 5, 6 and 7 ton capacities? Only a few lines give these capacities, yet the haulage economy is better established in trucks of these capacities than smaller trucks. The heavy-duty truck field offers you a special opportunity—and the Sternberg meets your needs. Write for circular.



When Writing, Please Say—"Saw Your Ad. in the C C J"



THE PIERCE-ARROW WORM GEAR DRIVE

THE Pierce-Arrow

5-Ton and 2-Ton Trucks
with the efficient worm-gear drive

The selling of a truck is as important in its way as the making of a truck. Our idea is that no truck should be sold for work which it is unfitted to perform, nor into territory where there are not adequate facilities for rendering proper service in maintenance. When these two questions have been settled satisfactorily, we are ready to make a sale. Are you ready to make a purchase?



THE PIERCE-ARROW MOTOR CAR CO. BUFFALO N.Y.

When Writing, Please Say—"Saw Your Ad. in the C C J"



DEALERS!

Low in Price; High in Quality.

Has every qualification to make it the most popular and widely-used commercial car in the world. Light, yet strong; simple, yet sturdy; fast, yet dependable; economical to operate, yet highly efficient; inexpensive to purchase, but will give reliable and long-continued service.

The producing company is established and financially responsible. Its new capital and new equipment devoted to a large production of Vim cars. Being ready to make early deliveries, it now desires a large number of responsible dealers throughout the United States.

Qualifying for Abuses Attending Commercial Service

15 H. P. Northway Truck Motor
35 H. P. " Cone Clutch
35 H. P. " Transmission
30 H. P. Rear Axle (Brown-Lipe Differential)



\$585.

Price with additional complete equipment, including dash storm front, drop curtain back of seat, heavy screen above tailboard, special heavy hinged tailboard with inside locks, and quick-detachable rims. —————>

\$635

F. O. B. Philadelphia

A REAL COMMERCIAL CAR—NOT A MAKESHIFT

The VIM is destined to be to the motor truck world what the Ford is to the pleasure car business—good value and a great seller

FROM THE VILLAGE MERCHANT TO THE DEPARTMENT STORE, EVERY BUSINESS HOUSE IS A GOOD PROSPECT

VIM SPECIFICATIONS

Engine—Northway light truck motor, 3" bore, 4½" stroke, four cylinders, water-cooled thermo-syphon; mechanically operated valves enclosed. Motor cast en bloc; crank shaft diameter, 2"; three main bearings. Larger parts throughout motor, displacement considered, than ever before offered, thus qualifying for abuses attending commercial service.

Horse Power—15-20.

Clutch—Leather-faced cone, 12" diameter, 2½" face; designed for 30 H. P. loading, thus qualifying for abuses attending commercial service.

Transmission—Three-speed and reverse selective sliding gears, ¾", six and eight pitch; shafts all of nickel alloy, mounted on imported annular bearings, mounted as unit with motor.

Lubrication—Positive force feed and splash; capacity 2 gallons, sufficient for 600 miles.

Ignition—Atwater Kent Multi-Sparker enabling easy starting and economy.

Control—Left-hand drive, right-hand control for gear shift and emergency brake.

Brakes—Contracting on rear wheel drums for service, internal expanding on rear wheel drums for emergency; 10" diameter, 2½" wide and Raybestos-faced. Both brakes equalized.

Axles—Front axle special drop-forged steel in one-piece I-beam section; Knuckles and steering arms are drop forged and heat treated. Rear axle full floating, equipped with Brown-Lipe differential of alloy steel; drive shafts 1½" diameter; differential and wheels mounted on Hyatt flexible roller bearings; trussed torque member enclosing propeller shaft. Entire unit designed with reference to overloading and abuse attending commercial service.

Wheels—12 spoke, 1¼" size of spoke, Schwarz Artillery wheels, equipped with rims for 30 x 3 and 30 x 3½ tires.

Wheelbase—89", tread 56", angle of steering 35°.

Gasoline Tank—Located under seat; 7 gallon capacity; conveniently arranged for filling.

Springs—Semi-elliptic front and rear; special heat-treated steel; 2" wide.

Weight—1575 pounds.

Body—Steel body, all joints welded, providing an endless steel frame without joints whatsoever, making the most substantial body to build. Inside loading measurements, 56" long, 54" high, 42" wide.

Finish—French Gray with Monitor Gray mouldings.

Speed—2 to 25 miles per hour.

Frame—Pressed steel channel, depth 3½".

Regular Equipment—Pressed steel support and canopy extending forward from the body 26"; two special oil lights in front; one in rear, showing red to rear and white on license tag.

WRITE OR WIRE FOR AGENCY TERMS

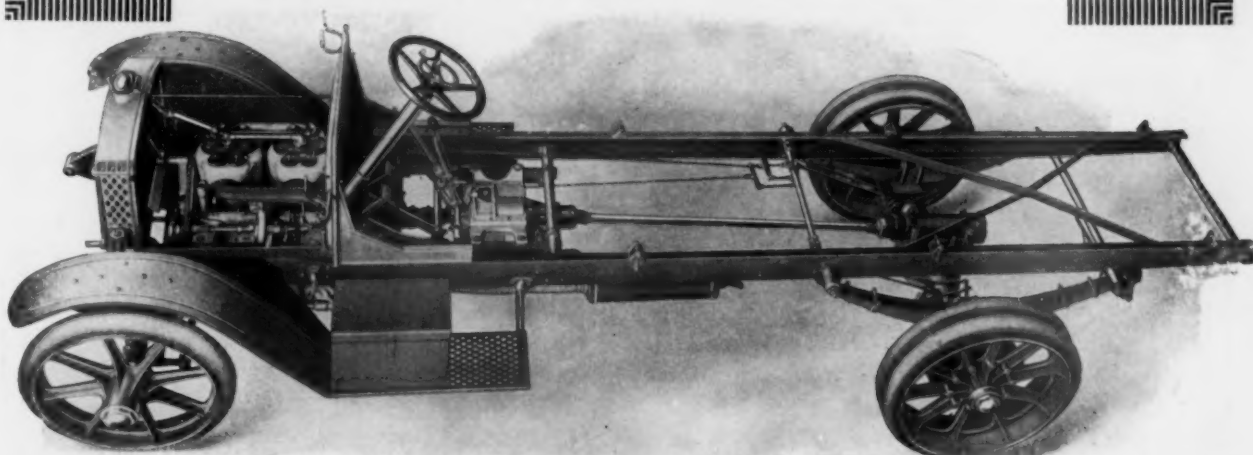
The Touraine Co., Factory, Broad & Huntingdon Sts., Phila, Pa.

Makers of the Touraine Six Pleasure Car



CROWN

WORM-DRIVE MOTOR TRUCKS



CROWN 5000 POUND CHASSIS

ANNOUNCEMENT!

We beg to announce the 1½ ton and 2½ ton *Crown Worm-Driven* Commercial Cars for 1914.

Crown Trucks are the result of long experience and careful study of the best in engineering, and manufacturing practice.

Every part—every unit—every bolt, nut and screw, is a substantial case of "*not how cheap*" but "*HOW GOOD.*" Crown Trucks are built for stability and efficiency, for all road conditions and all types of service—and to give unbounded *satisfaction to their owners.*

Responsible, energetic dealers are invited to Correspond with us at once. We seek a few more selling representatives—live ones—those who recognize merit and desire to connect with a dependable, lasting and efficient selling proposition.

Crown Worm-Driven Trucks Stand Supreme

Send for complete catalog, terms and detailed information. Write today.

CROWN COMMERCIAL CAR CO.

Factories:
North Milwaukee, Wis.

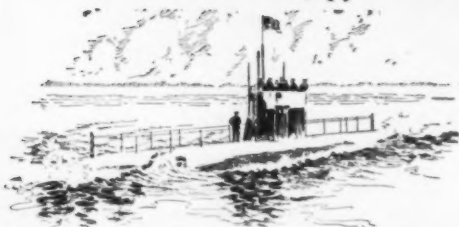
Milwaukee, Wis., U. S. A.

When Writing, Please Say—"Saw Your Ad. in the C C J"

GOULD VEHICLE BATTERIES

Chemically Powerful

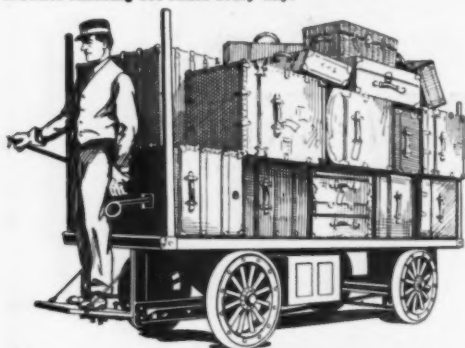
Mechanically Strong



The fully charged Gould Storage Battery of a submarine vessel in our navy has enough power to drive 130 automobiles 100 miles. The Russian, Austrian and Japanese navies have similar installations.



Every Michigan Central train that goes through the Detroit River Tunnel depends upon a Gould Storage Battery for power. This battery is large enough to keep 300 automobiles running 100 miles every day.



Baggage on the station platforms of the Pennsylvania Railroad and Grand Central Terminals, New York, is handled on trucks driven by Gould Vehicle Batteries.

Gould *Vehicle* Batteries were designed by the same brains and with the same facilities that made the Gould triumphs indicated by illustrations herewith.

The strong friendship of experienced electric vehicle users for the Gould Battery comes from the economical and dependable service assured by our simple construction and by our provision for continued high electrical capacity.

The Gould positive plate construction produces high energy output per unit weight of battery, and does so through the use of a *hard* oxide composition that absolutely prevents the troubles common to the usual *soft* paste composition. The active particles, being better bound into the plate, *must* do maximum work before shedding, especially that only a thin surface layer, instead of the whole mass of oxide, becomes active to produce full electrical capacity. *Much longer plate life* is thus secured through slower natural wear, immunity to shedding from jarring and vibration of the vehicle, and less harm from too long or too rapid charging.

This has been proven time and again where Gould plates have been used for renewals in batteries of other make. Almost invariably renewal with Gould plates increases the service radius of a vehicle and cuts maintenance cost to the low limit.

AN AGENCY OPPORTUNITY FOR DEALERS and CHARGING STATIONS

Gould Vehicle Batteries and renewal plates (which fit jars of any make) quickly establish a reputation which makes subsequent sales come easy. Our liberal treatment of customers further tends to play into our representatives' hands and makes an agency for Gould Batteries extremely desirable. Our proposition would enable you to make good money. Ask for particulars.

Gould Storage Battery Co.

General Offices: 30 East 42nd St., New York City. Works: Depew, New York

BOSTON—89 State Street
PHILADELPHIA—613 Betz Building

AGENTS: Topeka, Los Angeles, Seattle.

CLEVELAND—American Trust Bldg.
DETROIT—Boyer Building

CHICAGO—The Rookery
SAN FRANCISCO—904 Rialto Bldg.

Canadian Representative: R. E. T. Pringle, Montreal, Toronto, Winnipeg, Vancouver

Advertisers' Index

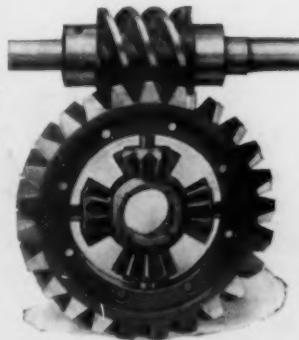
| | | | |
|---|---|---|--|
| Acme Universal Joint Mfg. Co. 102 | DeKalb Wagon Company Back Cover | Janney, Steinmetz & Co. 109 | Remy Electric Co. 109 |
| Adams Bros. Co. 84 | Durant-Dort Carriage Co. Flint Motor Wagon Dept. 81 | Johns-Manville, H. W. Co. 111 | Republic Rubber Co. 122 |
| Alma Motor Truck Co. 117 | Dyneto Electric Co. 106 | Jones, Phineas, & Co. 100 | Ross Gear & Tool Co. 101 |
| American Bronze Co. 105 | Edison Storage Battery Co. 79 | Kermath Mfg. Co. 123 | Rowe Motor Mfg. Co. 102 |
| Anderson Electric Car Co. 103 | Electric Storage Battery Co. 87 | Koehler, H. J., S. G. Co. 102 | Rutenber Motor Co. 95 |
| Apple Electric Co. 108 | Electric Vehicle Association of America. 121 | Konigslow, Otto, Mfg. Co. 112 | |
| Autocar Co. 2 | Federal Motor Truck Co. 83 | Kramer, B. G. Co. 93 | Sager, J. H., Co. 106 |
| Avery Co. 101 | Federal Pressed Steel Co. 119 | Krebs Commercial Car Co. 110 | Schwarz Wheel Co. 85 |
| Baker Motor Vehicle Co. 132 | Firestone Tire & Rubber Co. 69 | Lavigne Gear Co. 112 | Selden Truck Sales Co. 101 |
| Beasmer Motor Truck Co. 109 | Ford Motor Co. 103 | Lippard-Stewart Motor Car Co. 91 | Service Recorder Co. 106 |
| Booth, N. E. 122 | Funke, Herbert F. L., Co., Inc. 109 | Long Mfg. Co. 101 | Sheldon Axle Co. 120 |
| Borg & Beck Co. 118 | G. C. Vaporizer Co. of America Inc. 104 | McQuay-Norris Mfg. Co. 89 | Smith, A. O. Co. 114 |
| Bowen Mfg. Co. 123 | General Motors Truck Co. 88 | Michigan Steel Casting Co. 118 | Spicer Mfg. Co. 113 |
| Bower Roller Bearing Co. 78 | General Vehicle Co., Inc. 94 | Motsinger Device Mfg. Co. 103 | Splitdorf Electrical Co. 90 |
| Bowser, S. F. & Co., Inc. 99 | Gibney Tire & Rubber Co. 76 | New Departure Mfg. Co. 107 | Standard Motor Truck Co. 86 |
| Brockett-Gorham Co. 123 | Goodrich, B. F., Co. 97 | Packard Motor Car Co. 124, 125 | Standard Welding Co. 103 |
| Buckeye Jack Mfg. Co. 122 | Goodyear Tire & Rubber Co. 107 | Palmer-Meyer Motor Car Co. 104 | Sternberg Mfg. Co. 126 |
| Chicago Pneumatic Tool Co. 77 | Gould Storage Battery Co. 130 | Palmer-Moore Co. 115 | Stewart Motor Corporation. 106 |
| Childs, O. J., Co. 105 | Gramm-Bernstein Co. 102 | Parish & Bingham Co. 122 | Stewart-Warner Speedometer Corp. 98 |
| Cleveland Worm & Gear Co. 119 | Hartford Auto Parts Co. 80 | Peacock, Clarence N. & Co. 124, 125 | Touraine Co. 128 |
| Commerce Motor Car Co. Inside Back Cover | Hayes Wheel Co. 105 | Perfection Spring Co. 108 | United States Tire Co. 74 |
| Cotta Transmission Co. 104 | Herz & Co. 105 | Pierce-Arrow Motor Car Co. 127 | Van Dorn & Dutton Co. 104 |
| Covert Motor Vehicle Co. 108 | Hess-Bright Mfg. Co. 113 | Pierce Speed Controller Co. 124, 125 | Veeder Mfg. Co. 92 |
| Cramp, Wm. & Sons, S. & E. Bldg. Co. 96 | Highland Body Mfg. Co. 82 | Polack Tyre & Rubber Co. 116 | Velie Motor Vehicle Co. 123 |
| Croce Automobile Co. 114 | Hindley Gear Co. 131 | Pyrene Mfg. Co. 111 | Waukesha Motor Co. 75 |
| Crown Commercial Car Co. 129 | International Harvester Co., of America. 107 | | White Co. 71 |
| Cullman Wheel Co. 110 | | | Worcester Pressed Steel Co. 108 |

HINDLEY

Worm Gear Axle

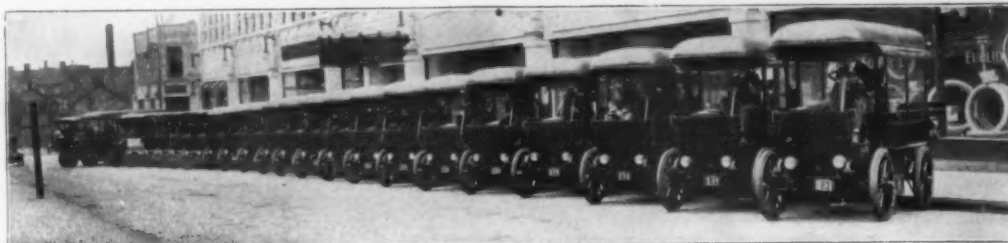
The Modern Drive for Commercial Trucks . . . Safe, Silent, Efficient

By increasing the length of service and decreasing the cost of upkeep it has proved itself to be the ideal drive for heavy-duty motor trucks. It does away with the annoyance and expense of broken chains, and maintains high efficiency. Runs in oil, is noiseless, dust and trouble-proof.



Our engineering department and over half century of experience in gear cutting is at your disposal in adopting this modern drive. Write us today for further information.

**The Hindley
Gear Company**
1105 Frankford Avenue
PHILADELPHIA, PA.



A Fleet of Twenty-four Baker Electric Trucks in Cleveland Delivery Service

Baker Electric Trucks

cost a little more to purchase, but every extra dollar is accounted for specifically in superior construction, more labor, better material. It represents not only more truck value for the money, but more service value. The difference comes in easier operation, lower cost, longer life. These savings run into money in a ten year period of truck operation—easily ten times the additional price of a Baker Truck. Hence its much greater economy in the end.

Additional Cost of Manufacture Itemized in Following Percentage Figures:

| | |
|---|--------------|
| Control Lever Located on Steering Post. | |
| Controller Enclosed in Dust Proof Cast Aluminum Box..... | 2 % |
| Springs of Especially Toughened Steel. | |
| Shackle Bolts Bronze Bushed | 1 % |
| Locked Spoke Wheels—Oversize Tires..... | 2 % |
| Front and Rear Axles Stronger..... | 1 % |
| 300% Overload Capacity Motor. Driving Chain Runs in Bath of Oil—50% Wider Sprocket of Hardened Steel..... | 2 % |
| Two Sets of Double Brakes. Pressed Steel Chassis Frame.. | 2 % |
| Complete Equipment Without Extra Cost..... | 2 % |
| More Exact Machining and Better Material..... | 1½ % |
| TOTAL | 13½ % |

Some of these superior features are found in other trucks; but in no other truck than the Baker are they all found in equal degree. Hence the higher price of Baker trucks which is not considerable, the lower cost of Baker operation which is very considerable.

"Electric Trucks Last for Ten Years"

THE BAKER MOTOR VEHICLE CO., CLEVELAND



When Writing, Please Say—"Saw Your Ad. in the C C J"

Selling Fleets of Commerce Cars

BIG merchants who began with two and three Commerce Cars are now installing fleets of Commerce Cars as the solution of their delivery problems.

They have tested the Commerce Car as they once tested adding machines and cash registers, and found it to be an actual business economy and, consequently, a sound business investment.

Every Commerce Car in operation today is selling Commerce Cars. Its actual performance is its best selling point. Merchants are buying Commerce Cars today on the records of the Commerce Cars operated by their competitors.

This is the fourth year of the Commerce Car. And the enormous demand for the Commerce this year is due, we believe, to our two years of experimenting and testing under the severest possible conditions before we offered the Commerce Car for sale.

Today we know we have the simplest, most dependable, most efficient and most economical delivery car on the market.

And the sale of the Commerce confirms that judgment.

Commerce Car dealers deserve a large share of the credit of Commerce success.

We have selected them very slowly and carefully. They are business men—in the automobile business for consistent growth and permanent, legitimate profits. They have the spirit of the Commerce Motor Car Company. Many of them are pleasure car dealers who have been progressive enough to install a Delivery Car Department and thereby establish a steady twelve-month-a-year business.

They have found the Commerce Car to be precisely all we claimed for it—a single chassis, a single model (that's all we make) "fool-proof" delivery car for which the merchant of the big city and the merchant of the small town have been waiting for ten years.

If you are that kind of a dealer, we want you. Write or wire for details. Better yet, come to Detroit, see the Commerce Car and the Commerce factory, and sense the spirit of our whole organization.

THE COMMERCE MOTOR CAR COMPANY

Administration Department, 625-630 Penobscot Bldg.

DETROIT, MICHIGAN



When Writing, Please Say—"Saw Your Ad. in the C C J"

SPECIFICATIONS

1000-pound capacity, 25 per cent overload, guaranteed.

Equipment, including electric horn, complete.

32 x 3 1/2 Goodyear pneumatic tire, or
34 x 2 1/2 Goodyear-Mota truck tire.

Express, full panel, or canopy top.

Clear floor space:

64 inches long;
42 inches wide;
52 1/2 inches high.

Gear ratio:

6 to 1 on high.
20 to 1 on low.

Friction Drive.

Wheelbase, 102 inches.

DeKalb Trucks

DELIVERERS OF REAL SERVICE



Trucks That Are Business Builders for Dealers

The continued success of a dealer who hustles is more dependent upon the service given by the first trucks he sells than upon any other factor.

The eyes of competitors and prospects as well as the purchaser himself are ever on those trucks, and any failure to make good is noted and the trucks condemned.

Many a hope of a highly prosperous agency has been blasted because the trucks wouldn't stand up or the concern producing them wouldn't live up to its promises.

The dealer handling the **DeKalb** runs no such risks. The truck is built to give real service—efficient, economical and lasting—and the price was made as low as was consistent with the quality of the truck.

The first sale but paves the way for others. Each truck will soon earn a reputation for giving service that will be more convincing than tons of printed matter.

The records being made by DeKalb in your own locality will be your strongest selling argument, and every truck on the street will be a business builder for you.

These brief specifications tell in part why the DeKalb makes good—Timken Axles, front and rear; Continental Motor; Bosch Magneto; Stromberg Carburetor; Pressed-Steel Frame; Three-Point Suspension on Motor and Transmission; Selective Sliding-Gear Transmission; Non-Reversible Worm-gear Steering Gear; Left Drive; Center Control; Two Ton Capacity; Special Type Cone Clutch, etc.

The DeKalb is the truck for you if you want to handle a high-class, heavy-duty truck, correctly designed and built, of unquestioned worth and backed up by a company of long standing, financial responsibility and unblemished reputation.

Good Territory Open----More Dealers Wanted

Write today for territory, terms and complete specifications

DeKALB WAGON CO. : DeKalb, Illinois

CHICAGO SALES OFFICE, 1532 MICHIGAN AVENUE

When Writing, Please Say—"Saw Your Ad. in the C C J"

